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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-9) LAUNCH

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16. ABSTRACT

This report presents a summary of selected atmospheric conditions observed near Space Shuttle STS-9 launch time on November 28, 1983, at Kennedy Space Center, Florida. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of pre-launch Jimsphere measured vertical wind profiles is given in this report. The final meteorological tape, which consists of wind and thermodynamic parameters versus altitude, for STS-9 vehicle ascent has been constructed. The STS-9 ascent meteorological data tape has been constructed by Marshall Space Flight Center in response to Shuttle task agreement No. 561-81-22-368 with Johnson Space Center.

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ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-9) LAUNCH

I. INTRODUCTION

This report presents an evaluation of the atmospheric environmental data taken during the launch of the Space Shuttle/STS-9 vehicle. This Space Shuttle vehicle was launched from Pad 39A at Kennedy Space Center (KSC), Florida, on a bearing of 35 deg east of north at 1600 UT (1100 EDT) on November 28, 1983.

This report presents a summary of the atmospheric environment at launch time (L+0) of the STS-9, together with the sequence of prelaunch Jimsphere measured winds aloft profiles from L-14 hr through liftoff. The general weather situation for the launch and flight area is described, and surface and upper level wind/thermodynamic observations near launch time are given. Since the ship Redstone was unavailable for STS-9 duty, the SRB descent/impact atmospheric data were not taken. However, one can use the STS-9 ascent data for SRB studies, as the best substitute.

Previous MSFC-related launch vehicle atmospheric environmental conditions have been published as Appendix A of individual MSFC Saturn Flight Evaluation Working Group reports [1]. Office memorandums have been issued for previous flights giving launch pad wind information. A report has also been published [2] which summarizes most launch atmospheric conditions observed for the past 155 MSFC/ABMA-related vehicle launches through SA-208 (Skylab 4). Reports summarizing ASTP, STS-1, STS-2, STS-3, STS-4, STS-5, STS-6, STS-7, and STS-8 launch conditions are presented in References 3, 4, 5, 6, 7, 8, 9, 10, and 11, respectively.

II. SOURCES OF DATA

Atmospheric observational data used in this report were taken from synoptic maps made by the National Weather Service, plus all available surface observations and measurements from around the launch area. Upper air observations were taken from balloon-released instruments sent aloft from Cape Canaveral Air Force Station (CCAFS). High-altitude winds and thermodynamic data were measured by the Super-Loki rocketsondes launched from the CCAFS. Table 1 presents a listing of systems used to obtain the upper level wind profiles used in compiling the final ascent meteorological data tape. Data cutoff altitudes are also given in Table 1.

III. GENERAL SYNOPTIC SITUATION AT LAUNCH TIME

A cold front, extending out of a low pressure area in Iowa, was passing through eastern Georgia and western Florida just prior to STS-9 liftoff. The influence of high pressure over eastern Florida was weakening as this front approached. Moderate, southerly winds bringing in warm temperatures and humid conditions prevailed throughout the early morning countdown period. Figure 1 presents the surface map conditions 4 hr before STS-9 launch. Figure 2 presents

the winds aloft conditions at the 500 mb pressure level 4 hr before launch. Southwesterly to westerly winds dominated the flow aloft over the KSC Florida area.

Cloudiness increased throughout the morning of November 28, 1983, with the source being the frontal system located to the north and west of KSC. Figure 3 presents the GOES-5 visible picture taken at liftoff (1600 UT). Overcast skys consisting of 1/10 cumulus at 2500 ft, 3/10 stratocumulus at 5,500 ft and 10/10 cirrostratus at 30,000 ft were present during launch. Figure 4 shows an up-close visible shot of the Florida peninsula as recorded by GOES-5, taken at 1600 UT.

IV. SURFACE OBSERVATIONS AT LAUNCH TIME

Surface observations at launch time for selected KSC locations are given in Table 2. Included are pad 39A, shuttle runway, and CCAFS balloon release station observations. Neither precipitation nor lightning was observed at launch time.

Table 3 presents Pad 39A wind data along with other standard hourly meteorological measurements and sky observations for the 6-hr period prior to launch of STS-9. Values for wind speed and direction are given for the 84 m (275 ft) FSS reference level and 18 m (60 ft) pad light pole level.

V. UPPER AIR MEASUREMENTS DURING LAUNCH

The FPS-16 Jimsphere (1615 UT), MSS Rawinsonde (1604 UT), Super-Loki Rocketsonde (1800 UT), and Super-Loki Robin (1900 UT) systems were used to measure the upper level wind and thermodynamic parameters for STS-9 launch. At altitudes above the rocket-measured data, the Global Reference Atmosphere (GRA) [12] parameters for November KSC conditions were used. A tabulation of the STS-9 final meteorological data for ascent is presented in Table 4 which lists the wind and thermodynamic parameters versus altitude. A brief summary of parameters is given in the following paragraphs.

A. Wind Speed

At launch time, wind speeds were 19.1 ft/sec (11.3 kn) at 60 ft and increased to a maximum of 117 ft/sec (69 kn) blowing from 252 deg. This maximum occurred at an altitude of 47,100 ft (14,356 m). The winds increased above this level as shown in Figure 5. The overall maximum measured speed was 249 ft/sec (147 kn) at 164,000 ft (49,987 m) altitude.

B. Wind Direction

At launch time, the 60-ft wind direction was from the south (183 deg) and shifted through the southwest to become a westerly component above 33,000 ft (10,058 m). Winds remained in the winter-westerly regime at all measureable altitudes above this level. Figure 5 shows the complete wind direction versus altitude profile. As shown in Figure 5, wind direction became quite variable at altitudes with low wind speeds.

C. Prelaunch/Launch Wind Profiles

Prelaunch/launch wind profiles presented in Figures 6 through 9 were measured by the Jimsphere FPS-16 system. Data are shown for the L-11 hr, L-7.25 hr, L-3.5, and L+0 measurement periods.

The wind speed and direction profiles for the 11-hr period prior to and including L+0 are shown in Figures 6 and 7. The in-plane (right crosswind) and out-of-plane (left crosswind) profiles are given on Figures 8 and 9. The wind speeds and component speeds were not significantly different from the November mean values in the 30,000 to 50,000 ft layer during the period for which data are shown.

D. Thermodynamic Data

The thermodynamic data taken at STS-9 launch time, consisting of atmospheric temperature, dew-point temperature, pressure, and density have been compiled as the STS-9 ascent meteorological data and are presented in Table 4. The vertical structure of temperature for the STS-9 ascent is shown graphically versus altitude in Figure 10.

The atmospheric thermodynamic parameters of temperature, pressure, and density, measured during STS-9 launch below 113,000 ft (34,442 m) were all within 6 percent of their respective PRA-63 [13] annual values. All these parameters stayed within 19 percent of their respective PRA-63 values, at all levels of measurement.

E. SRB Upper Air and Surface Measurements

As has been mentioned in the introduction, since there was no ship available, an SRB descent meteorological data tape has not been constructed. The tabular values for the ascent meteorological tape as presented in Table 4 should be used for SRB descent/impact studies since it is the closest measured data source.

VI. ATMOSPHERIC SUMMARY CONDITIONS FOR STS LAUNCHES

Given in Table 5 are selected atmospheric L+0 launch conditions for all the Space Shuttle launches.

TABLE 1. SYSTEMS USED TO MEASURE UPPER AIR WIND DATA FOR STS-9 ASCENT

Type of Data	Date: November 28, 1983		Portion of Data Used			
	Release Time		Start		End	
	Time (UT) (hr:min)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)	Altitude m (ft)	Time After L+0 (min)
FPS-16 Jimsphere	16:15	15	6 (21)	15	17,373 (57,000)	74
MSS Rawinsonde	16:04	4	17,678 (58,000)	62	29,870 (98,000)	102
Super-Loki Rocketsonde (Datasonde)	18:00	120	65,227 (214,000)	120	30,175 (99,000)	138
Super-Loki Rocketsonde (Robin)	19:00	180	82,601 (271,000)	180	65,532 (215,000)	181

TABLE 2. SURFACE OBSERVATIONS AT STS-9 LAUNCH TIME

Location[a]	Time After L+0 (min)	Pressure (MSL) N/cm² (psia)	Temperature °K (°F)	Dew Point °K (°F)	Relative Humidity (%)	Visibility km (miles)	Sky Cover			Wind	
							Cloud** Amount	Cloud Type	Height of Base Meters (ft)	Speed ft/sec (kt)	Direction (deg)
NASA Space Shuttle Runway X68[e] Winds Measured at 10.4 m (34 ft)	-5	10.159 (14.734)	298.6 (77.8)	293.2 (68.0)	72	16 (10)	1	Strato-Cumulus	762 (2,500)	16.9 (10.0)	180
							3	Strato-Cumulus	1,676 (5,500)		
							10	Cirro-Stratus	6,401 (21,000)		
CCAFS[c] Surface Measurements	-1	10.156 (14.730)	298.3 (77.2)	294.3 (70.0)	79	16 (10)	1	Cumulus	762 (2,500)	18.6 (11.0)	160
							10	Cirrus	6,401 (21,000)		
Pad 39A Lightpole SE 18.3 m (60.0 ft)	0	10.159* (14.734)	297.6 (76.0)	294.5 (70.3)	83	-	-	-	-	19.1[b] (11.3)	183[b]
Pad 39A FSS (Top SE) 83.8 m (275 ft)	0	-	-	-	-	-	-	-	-	32.0[b] (18.9)	190[b]

*Pad 39A Camera Site 3 barometric pressure instrument appeared to be reading too high. Therefore, the KSC Shuttle runway station pressure value interpolated to 10.153 N/cm² at 21 ft above MSL was used as the L+0 pad atmospheric pressure measurement.

**Ten-tenths total sky cover.

a. Altitudes of measurements are above natural grade, except where noted.

b. Approximately 1 min average prior to L+0.

c. Balloon release site.

d. Pad 39A thermodynamic measurements are taken at camera site No. 3, approximately 6.4 m (21 ft) above MSL.

e. Official STS-9 sky observational site.

TABLE 3. STS-9 PRE-LAUNCH THROUGH LAUNCH KSC PAD 39A METEOROLOGICAL MEASUREMENTS[a]

Hourly Atmospheric Measurements								Sky Condition[b]			
28 November 1983 Time UT	Temp. (°F)	Dew Point (°F)	RH (%)	275' Level (SE)[c]		60' Level (SE)[c]		Clouds	Total Sky Cover	Vis. (mi)	Other Remarks
				WS Kt	WD°	WS Kt	WD°				
1000	72	72	100	35	210	12	180	Scattered at 3,000 ft Scattered at 21,000 ft	3/10	10	
1100	72	72	100	33	210	12	170	Scattered at 3,000 ft Scattered at 10,000 ft	2/10	10	
1200	70	69	99	28	250	8	200	Scattered at 2,500 ft Scattered at 9,000 ft Scattered at 30,000 ft	4/10	10	
1300	73	73	99	25	260	8	190	Scattered at 5,000 ft Broken at 30,000 ft	9/10	10	
1400	73	70	89	28	230	14	170	Scattered at 2,500 ft Scattered at 6,000 ft Broken at 30,000 ft	9/10	10	
1500	74	69	85	25	240	14	140	Scattered at 2,500 ft Scattered at 5,500 ft Overcast at 30,000 ft	10/10	10	
L+0[d] 1600	76	70	83	19	190	11	183	1/10 SC at 2,500 ft 3/10 SC at 5,500 ft 10/10 CS at 30,000 ft	10/10	10	

a. Hourly observations obtained verbally from CCAFS.

b. Sky observations taken at the Shuttle runway site X68.

c. 10 min mean about the hour from pad 39A instrumentation.

d. L+0 PAD Wind and thermodynamic parameters obtained from HOSC strip charts. SE Anemometers used at 60 and 275 ft levels for L+0 wind conditions (approximately 10 sec average prior to L+0). Pad 39A L+0 atmospheric pressure, at 21 ft (MSL), was 10.153 N/cm^2. Sea level pressure was 10.159 N/cm^2.

TABLE 4. STS-9 METEOROLOGICAL DATA TAPE ASCENT

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
000021	019	180	24.4	.1015+04	.1177+04	21.3
000100	025	185	24.3	.1012+04	.1175+04	21.2
000200	030	188	24.2	.1009+04	.1171+04	21.0
000300	032	190	24.1	.1005+04	.1168+04	20.8
000400	030	185	23.9	.1002+04	.1164+04	20.6
000500	029	180	23.8	.9984+03	.1161+04	20.4
000600	032	185	23.7	.9949+03	.1157+04	20.2
000700	031	192	23.6	.9914+03	.1154+04	20.1
000800	030	192	23.4	.9879+03	.1150+04	19.9
000900	032	189	23.3	.9845+03	.1147+04	19.7
001000	035	194	23.2	.9810+03	.1143+04	19.5
001100	035	196	23.0	.9776+03	.1140+04	19.5
001200	033	197	22.8	.9742+03	.1137+04	19.5
001300	034	198	22.6	.9708+03	.1133+04	19.4
001400	037	200	22.4	.9674+03	.1130+04	19.4
001500	036	202	22.3	.9640+03	.1127+04	19.4
001600	038	198	22.1	.9606+03	.1124+04	19.4
001700	042	201	21.9	.9572+03	.1120+04	19.4
001800	041	205	21.7	.9539+03	.1117+04	19.3
001900	038	212	21.5	.9505+03	.1114+04	19.3
002000	043	209	21.3	.9472+03	.1111+04	19.3
002100	046	212	21.1	.9439+03	.1108+04	19.1
002200	041	215	20.8	.9406+03	.1105+04	19.0
002300	041	212	20.6	.9373+03	.1102+04	18.8
002400	043	213	20.4	.9340+03	.1099+04	18.6
002500	040	213	20.2	.9308+03	.1096+04	18.5
002600	039	211	19.9	.9275+03	.1093+04	18.3
002700	041	208	19.7	.9243+03	.1090+04	18.1
002800	039	210	19.5	.9210+03	.1087+04	17.9
002900	037	209	19.2	.9178+03	.1084+04	17.8
003000	039	207	19.0	.9146+03	.1081+04	17.6
003100	038	211	18.7	.9113+03	.1079+04	17.4
003200	038	214	18.5	.9081+03	.1076+04	17.2
003300	040	214	18.2	.9049+03	.1073+04	17.0
003400	039	219	17.9	.9017+03	.1071+04	16.8
003500	041	218	17.7	.8985+03	.1068+04	16.6
003600	042	220	17.4	.8953+03	.1065+04	16.3
003700	041	220	17.1	.8922+03	.1062+04	16.1
003800	043	221	16.8	.8890+03	.1060+04	15.9
003900	041	225	16.6	.8859+03	.1057+04	15.7
004000	040	223	16.3	.8827+03	.1054+04	15.5
004100	041	227	16.2	.8796+03	.1051+04	15.4
004200	038	228	16.0	.8765+03	.1048+04	15.2
004300	040	225	15.9	.8733+03	.1045+04	15.1
004400	039	229	15.7	.8702+03	.1042+04	14.9
004500	038	230	15.5	.8671+03	.1039+04	14.8
004600	041	227	15.4	.8640+03	.1036+04	14.7
004700	038	234	15.3	.8610+03	.1032+04	14.5
004800	036	235	15.1	.8579+03	.1029+04	14.4
004900	040	234	15.0	.8548+03	.1026+04	14.2

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
005000	040	238	14.8	.8518+03	.1023+04	14.1
005100	041	237	14.8	.8487+03	.1020+04	13.5
005200	043	239	14.8	.8457+03	.1016+04	13.0
005300	043	246	14.9	.8427+03	.1013+04	12.4
005400	043	247	14.9	.8397+03	.1009+04	11.8
005500	048	250	14.9	.8367+03	.1006+04	11.3
005600	047	256	14.9	.8337+03	.1002+04	10.7
005700	045	255	14.9	.8307+03	.9988+03	10.1
005800	047	252	15.0	.8277+03	.9954+03	9.5
005900	046	256	15.0	.8247+03	.9919+03	9.0
006000	044	254	15.0	.8218+03	.9885+03	8.4
006100	046	251	14.8	.8188+03	.9858+03	7.9
006200	046	252	14.6	.8159+03	.9830+03	7.4
006300	045	251	14.4	.8130+03	.9803+03	7.0
006400	045	248	14.2	.8100+03	.9776+03	6.5
006500	044	251	14.0	.8071+03	.9749+03	6.0
006600	043	251	13.8	.8042+03	.9722+03	5.5
006700	042	248	13.6	.8013+03	.9695+03	5.0
006800	043	250	13.4	.7985+03	.9668+03	4.6
006900	041	251	13.2	.7956+03	.9641+03	4.1
007000	041	249	13.0	.7927+03	.9614+03	3.6
007100	044	252	12.8	.7899+03	.9587+03	3.1
007200	041	258	12.7	.7870+03	.9559+03	2.5
007300	042	255	12.5	.7841+03	.9531+03	2.0
007400	042	253	12.3	.7813+03	.9503+03	1.5
007500	042	253	12.2	.7785+03	.9475+03	1.0
007600	041	252	12.0	.7757+03	.9448+03	.4
007700	042	247	11.8	.7728+03	.9420+03	-.1
007800	042	245	11.6	.7700+03	.9392+03	-.6
007900	040	250	11.5	.7673+03	.9365+03	-1.2
008000	041	247	11.3	.7645+03	.9337+03	-1.7
008100	045	245	11.2	.7617+03	.9307+03	-2.2
008200	045	246	11.2	.7589+03	.9276+03	-2.7
008300	044	247	11.1	.7562+03	.9245+03	-3.2
008400	045	246	11.0	.7534+03	.9214+03	-3.7
008500	046	241	11.0	.7507+03	.9184+03	-4.2
008600	046	238	10.9	.7479+03	.9153+03	-4.8
008700	048	239	10.8	.7452+03	.9123+03	-5.3
008800	041	242	10.7	.7425+03	.9093+03	-5.8
008900	037	240	10.7	.7398+03	.9063+03	-6.3
009000	044	232	10.6	.7371+03	.9032+03	-6.8
009100	045	230	10.5	.7344+03	.9001+03	-7.1
009200	044	230	10.5	.7317+03	.8971+03	-7.5
009300	043	227	10.4	.7291+03	.8940+03	-7.8
009400	047	224	10.4	.7264+03	.8909+03	-8.2
009500	048	225	10.3	.7237+03	.8878+03	-8.5
009600	046	226	10.3	.7211+03	.8848+03	-8.8
009700	047	221	10.3	.7185+03	.8818+03	-9.2
009800	050	220	10.2	.7159+03	.8787+03	-9.5
009900	050	221	10.1	.7132+03	.8757+03	-9.9

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
010000	045	220	10.1	.7106+03	.8727+03	-10.2
010100	050	216	9.9	.7080+03	.8700+03	-10.1
010200	049	215	9.8	.7054+03	.8672+03	-10.0
010300	045	216	9.6	.7029+03	.8645+03	-9.9
010400	047	207	9.5	.7003+03	.8618+03	-9.8
010500	050	208	9.3	.6977+03	.8590+03	-9.8
010600	050	212	9.2	.6952+03	.8563+03	-9.7
010700	047	212	9.0	.6926+03	.8536+03	-9.6
010800	049	209	8.9	.6901+03	.8509+03	-9.5
010900	050	209	8.8	.6876+03	.8483+03	-9.4
011000	048	208	8.6	.6850+03	.8456+03	-9.3
011100	049	205	8.7	.6825+03	.8423+03	-9.6
011200	048	205	8.8	.6800+03	.8389+03	-9.9
011300	046	204	8.9	.6775+03	.8356+03	-10.2
011400	047	203	9.0	.6750+03	.8323+03	-10.5
011500	047	206	9.0	.6726+03	.8290+03	-10.7
011600	052	205	9.1	.6701+03	.8257+03	-11.0
011700	056	208	9.2	.6676+03	.8225+03	-11.3
011800	057	213	9.3	.6652+03	.8192+03	-11.6
011900	063	212	9.4	.6628+03	.8160+03	-11.9
012000	061	213	9.5	.6603+03	.8127+03	-12.2
012100	061	211	9.3	.6579+03	.8104+03	-12.3
012200	064	210	9.1	.6555+03	.8081+03	-12.5
012300	063	211	8.8	.6531+03	.8057+03	-12.6
012400	060	211	8.6	.6507+03	.8034+03	-12.7
012500	062	209	8.4	.6483+03	.8011+03	-12.8
012600	061	211	8.2	.6459+03	.7988+03	-13.0
012700	063	212	8.0	.6435+03	.7965+03	-13.1
012800	066	211	7.7	.6412+03	.7942+03	-13.2
012900	063	215	7.5	.6388+03	.7919+03	-13.4
013000	063	214	7.3	.6365+03	.7896+03	-13.5
013100	065	216	7.0	.6341+03	.7874+03	-13.4
013200	063	219	6.8	.6318+03	.7852+03	-13.3
013300	064	217	6.5	.6294+03	.7830+03	-13.2
013400	064	219	6.3	.6271+03	.7808+03	-13.1
013500	063	221	6.0	.6248+03	.7786+03	-13.0
013600	064	219	5.7	.6224+03	.7764+03	-12.8
013700	066	221	5.5	.6201+03	.7743+03	-12.7
013800	063	222	5.2	.6178+03	.7721+03	-12.6
013900	068	220	5.0	.6155+03	.7699+03	-12.5
014000	066	222	4.7	.6133+03	.7678+03	-12.4
014100	066	221	4.5	.6110+03	.7655+03	-12.7
014200	070	221	4.3	.6087+03	.7633+03	-12.9
014300	065	223	4.0	.6064+03	.7611+03	-13.2
014400	068	222	3.8	.6041+03	.7588+03	-13.4
014500	069	222	3.6	.6019+03	.7566+03	-13.7
014600	066	224	3.4	.5996+03	.7544+03	-14.0
014700	068	224	3.2	.5974+03	.7522+03	-14.2
014800	068	226	2.9	.5952+03	.7500+03	-14.5
014900	066	227	2.7	.5929+03	.7478+03	-14.7

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
015300	066	221	2.5	.5907+03	.7456+03	-15.0
015400	066	222	2.3	.5885+03	.7433+03	-15.5
015500	065	222	2.1	.5863+03	.7411+03	-16.0
015600	066	218	2.0	.5841+03	.7388+03	-16.5
015700	065	216	1.8	.5819+03	.7365+03	-17.0
015800	060	212	1.6	.5797+03	.7343+03	-17.5
015900	064	213	1.4	.5775+03	.7320+03	-18.1
016000	061	214	1.2	.5753+03	.7297+03	-18.6
016100	061	214	1.1	.5731+03	.7275+03	-19.1
016200	064	215	.9	.5710+03	.7253+03	-19.6
016300	062	216	.7	.5688+03	.7230+03	-20.1
016400	060	214	.5	.5667+03	.7209+03	-20.3
016500	063	210	.2	.5645+03	.7188+03	-20.6
016600	059	211	.0	.5624+03	.7167+03	-20.8
016700	061	209	-.3	.5603+03	.7147+03	-21.1
016800	059	207	-.5	.5581+03	.7126+03	-21.3
016900	059	211	-.7	.5560+03	.7105+03	-21.5
017000	057	212	-1.0	.5539+03	.7085+03	-21.8
017100	056	210	-1.2	.5518+03	.7064+03	-22.0
017200	059	212	-1.5	.5497+03	.7043+03	-22.3
017300	057	214	-1.7	.5476+03	.7023+03	-22.5
017400	057	212	-2.0	.5455+03	.7004+03	-22.7
017500	057	213	-2.3	.5434+03	.6984+03	-22.9
017600	056	215	-2.6	.5414+03	.6965+03	-23.1
017700	056	213	-2.9	.5393+03	.6946+03	-23.3
017800	057	214	-3.1	.5372+03	.6927+03	-23.5
017900	053	217	-3.4	.5352+03	.6908+03	-23.7
018000	056	213	-3.7	.5331+03	.6889+03	-23.9
018100	057	213	-4.0	.5311+03	.6870+03	-24.1
018200	053	218	-4.3	.5290+03	.6851+03	-24.3
018300	055	216	-4.6	.5270+03	.6832+03	-24.5
018400	058	215	-4.9	.5250+03	.6812+03	-24.7
018500	054	217	-5.1	.5229+03	.6793+03	-24.9
018600	058	216	-5.4	.5209+03	.6773+03	-25.1
018700	056	218	-5.6	.5189+03	.6753+03	-25.3
018800	055	214	-5.9	.5169+03	.6734+03	-25.5
018900	056	214	-6.2	.5149+03	.6714+03	-25.7
019000	055	214	-6.4	.5129+03	.6695+03	-25.9
019100	056	212	-6.7	.5109+03	.6676+03	-26.1
019200	056	213	-6.9	.5089+03	.6656+03	-26.3
019300	055	212	-7.2	.5069+03	.6637+03	-26.5
019400	058	212	-7.4	.5050+03	.6617+03	-26.7
019500	055	212	-7.7	.5030+03	.6597+03	-26.8
019600	058	211	-7.9	.5010+03	.6577+03	-27.0
019700	057	211	-8.1	.4991+03	.6557+03	-27.2
019800	056	210	-8.3	.4971+03	.6537+03	-27.3
019900	060	210	-8.6	.4952+03	.6517+03	-27.5
019A00	056	213	-8.8	.4932+03	.6497+03	-27.7
019B00	058	215	-9.0	.4913+03	.6477+03	-27.9
019C00	059	214	-9.3	.4894+03	.6458+03	-28.0

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
020000	055	219	-9.5	.4875+03	.6438+03	-28.2
020100	057	216	-9.7	.4856+03	.6418+03	-28.3
020200	057	218	-10.0	.4836+03	.6399+03	-28.4
020300	057	219	-10.2	.4817+03	.6379+03	-28.5
020400	059	214	-10.4	.4798+03	.6360+03	-28.6
020500	056	215	-10.6	.4780+03	.6340+03	-28.6
020600	052	219	-10.9	.4761+03	.6321+03	-28.7
020700	056	214	-11.1	.4742+03	.6301+03	-28.8
020800	053	217	-11.3	.4723+03	.6282+03	-28.9
020900	053	215	-11.6	.4705+03	.6263+03	-29.0
021000	055	217	-11.8	.4686+03	.6244+03	-29.1
021100	051	216	-12.1	.4667+03	.6225+03	-28.3
021200	054	216	-12.3	.4649+03	.6206+03	-27.4
021300	054	213	-12.6	.4630+03	.6188+03	-26.6
021400	054	215	-12.9	.4612+03	.6169+03	-25.8
021500	056	215	-13.1	.4594+03	.6151+03	-25.0
021600	058	211	-13.4	.4575+03	.6132+03	-24.1
021700	058	214	-13.7	.4557+03	.6114+03	-23.3
021800	056	211	-14.0	.4539+03	.6096+03	-22.5
021900	059	210	-14.2	.4521+03	.6077+03	-21.6
022000	059	212	-14.5	.4503+03	.6059+03	-20.8
022100	060	209	-14.6	.4485+03	.6038+03	-21.1
022200	062	209	-14.8	.4467+03	.6018+03	-21.5
022300	063	209	-14.9	.4449+03	.5997+03	-21.8
022400	068	212	-15.1	.4431+03	.5977+03	-22.1
022500	068	210	-15.3	.4414+03	.5957+03	-22.4
022600	070	209	-15.4	.4396+03	.5936+03	-22.8
022700	069	209	-15.5	.4378+03	.5916+03	-23.1
022800	065	211	-15.7	.4361+03	.5896+03	-23.4
022900	063	208	-15.8	.4343+03	.5876+03	-23.8
023000	064	203	-16.0	.4326+03	.5856+03	-24.1
023100	059	204	-16.1	.4308+03	.5834+03	-25.2
023200	063	204	-16.2	.4291+03	.5813+03	-26.3
023300	063	205	-16.2	.4274+03	.5792+03	-27.3
023400	059	209	-16.3	.4256+03	.5770+03	-28.4
023500	059	209	-16.4	.4239+03	.5749+03	-29.5
023600	063	209	-16.5	.4222+03	.5728+03	-30.6
023700	061	211	-16.6	.4205+03	.5707+03	-31.7
023800	061	209	-16.6	.4188+03	.5686+03	-32.7
023900	063	207	-16.7	.4171+03	.5665+03	-33.8
024000	062	212	-16.8	.4155+03	.5644+03	-34.9
024100	063	211	-16.9	.4138+03	.5624+03	-34.5
024200	065	210	-17.1	.4121+03	.5605+03	-34.1
024300	061	210	-17.2	.4104+03	.5585+03	-33.7
024400	062	213	-17.4	.4088+03	.5565+03	-33.3
024500	063	213	-17.5	.4071+03	.5546+03	-32.9
024600	058	218	-17.6	.4055+03	.5526+03	-32.5
024700	065	215	-17.8	.4038+03	.5507+03	-32.1
024800	066	215	-17.9	.4022+03	.5487+03	-31.7
024900	067	214	-18.1	.4006+03	.5468+03	-31.3

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
025000	067	216	-18.2	.3990+03	.5449+03	-30.9
025100	065	217	-18.4	.3973+03	.5430+03	-30.7
025200	066	218	-18.5	.3957+03	.5411+03	-30.5
025300	067	215	-18.7	.3941+03	.5393+03	-30.3
025400	066	217	-18.8	.3925+03	.5374+03	-30.1
025500	065	215	-19.0	.3909+03	.5356+03	-29.9
025600	062	216	-19.2	.3893+03	.5337+03	-29.6
025700	064	214	-19.3	.3877+03	.5319+03	-29.4
025800	063	219	-19.5	.3862+03	.5300+03	-29.2
025900	060	220	-19.6	.3846+03	.5282+03	-29.0
026000	059	219	-19.8	.3830+03	.5264+03	-28.8
026100	058	220	-20.0	.3815+03	.5247+03	-28.9
026200	060	217	-20.3	.3799+03	.5231+03	-29.0
026300	058	220	-20.5	.3783+03	.5214+03	-29.1
026400	058	221	-20.8	.3768+03	.5198+03	-29.2
026500	058	223	-21.0	.3752+03	.5181+03	-29.3
026600	056	219	-21.2	.3737+03	.5165+03	-29.5
026700	056	224	-21.5	.3722+03	.5149+03	-29.6
026800	058	227	-21.7	.3706+03	.5133+03	-29.7
026900	056	231	-22.0	.3691+03	.5117+03	-29.8
027000	058	230	-22.2	.3676+03	.5100+03	-29.9
027100	061	235	-22.3	.3661+03	.5082+03	-30.3
027200	063	237	-22.4	.3646+03	.5063+03	-30.6
027300	066	236	-22.6	.3631+03	.5045+03	-31.0
027400	067	238	-22.7	.3616+03	.5027+03	-31.3
027500	067	240	-22.8	.3601+03	.5008+03	-31.7
027600	071	237	-22.9	.3586+03	.4990+03	-32.1
027700	069	243	-23.0	.3571+03	.4972+03	-32.4
027800	070	241	-23.2	.3556+03	.4954+03	-32.8
027900	074	240	-23.3	.3542+03	.4936+03	-33.1
028000	072	244	-23.4	.3527+03	.4918+03	-33.5
028100	075	242	-23.7	.3512+03	.4903+03	-33.7
028200	076	243	-23.9	.3498+03	.4888+03	-33.9
028300	075	245	-24.2	.3483+03	.4873+03	-34.2
028400	075	245	-24.5	.3469+03	.4858+03	-34.4
028500	077	246	-24.7	.3454+03	.4843+03	-34.6
028600	076	244	-25.0	.3440+03	.4828+03	-34.8
028700	078	245	-25.3	.3426+03	.4813+03	-35.0
028800	078	244	-25.6	.3411+03	.4798+03	-35.3
028900	079	243	-25.8	.3397+03	.4784+03	-35.5
029000	077	242	-26.1	.3383+03	.4769+03	-35.7
029100	078	242	-26.3	.3369+03	.4753+03	-36.0
029200	077	241	-26.6	.3355+03	.4738+03	-36.2
029300	078	242	-26.8	.3341+03	.4722+03	-36.5
029400	077	242	-27.0	.3327+03	.4707+03	-36.7
029500	077	241	-27.2	.3313+03	.4692+03	-37.0
029600	075	242	-27.5	.3299+03	.4676+03	-37.3
029700	076	241	-27.7	.3285+03	.4661+03	-37.5
029800	076	240	-27.9	.3271+03	.4646+03	-37.8
029900	076	240	-28.2	.3257+03	.4631+03	-38.0

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
330000	C77	240	-28.4	.?243+03	.4615+03	-38.3
330100	C77	241	-28.7	.?230+03	.4601+03	-38.5
330200	C78	241	-29.0	.?216+03	.4587+03	-38.7
330300	C78	243	-29.2	.?202+03	.4573+03	-38.9
330400	C79	243	-29.5	.?189+03	.4558+03	-39.1
330500	C77	243	-29.8	.?175+03	.4544+03	-39.3
330600	C78	244	-30.1	.?162+03	.4530+03	-39.6
330700	C76	243	-30.4	.?148+03	.4516+03	-39.8
330800	C77	243	-30.6	.?135+03	.4502+03	-40.0
330900	C77	245	-30.9	.?122+03	.4488+03	-40.2
331000	C78	245	-31.2	.?108+03	.4474+03	-40.4
331100	C77	244	-31.4	.?095+03	.4460+03	-40.6
331200	C76	245	-31.7	.?082+03	.4445+03	-40.8
331300	C77	243	-31.9	.?068+03	.4431+03	-41.0
331400	C78	244	-32.2	.?055+03	.4416+03	-41.2
331500	C80	244	-32.4	.?042+03	.4402+03	-41.4
331600	C80	243	-32.7	.?029+03	.4388+03	-41.6
331700	C79	246	-32.9	.?016+03	.4373+03	-41.8
331800	C80	245	-33.2	.?003+03	.4359+03	-42.0
331900	C81	245	-33.4	.?990+03	.4345+03	-42.2
332000	C80	245	-33.7	.?977+03	.4331+03	-42.4
332100	C80	244	-34.0	.?964+03	.4317+03	-42.4
332200	C81	245	-34.2	.?952+03	.4303+03	-42.4
332300	C82	245	-34.5	.?939+03	.4289+03	-42.4
332400	C83	245	-34.8	.?926+03	.4275+03	-42.4
332500	C82	246	-35.0	.?913+03	.4262+03	-42.3
332600	C83	246	-35.3	.?901+03	.4248+03	-42.3
332700	C86	248	-35.6	.?888+03	.4234+03	-42.3
332800	C87	248	-35.9	.?876+03	.4221+03	-42.3
332900	C86	247	-36.1	.?863+03	.4207+03	-42.3
333000	C87	247	-36.4	.?851+03	.4194+03	-42.3
333100	C89	246	-36.6	.?838+03	.4179+03	-42.3
333200	C88	247	-36.8	.?826+03	.4163+03	-42.3
333300	C90	248	-36.9	.?813+03	.4148+03	-42.3
333400	C92	250	-37.1	.?801+03	.4133+03	-42.3
333500	C91	252	-37.3	.?789+03	.4118+03	-42.3
333600	C90	254	-37.5	.?777+03	.4103+03	-42.4
333700	C91	256	-37.7	.?764+03	.4089+03	-42.4
333800	C91	257	-37.8	.?752+03	.4074+03	-42.4
333900	C91	257	-38.0	.?740+03	.4059+03	-42.4
334000	C92	259	-38.2	.?728+03	.4044+03	-42.4
334100	C92	260	-38.4	.?716+03	.4029+03	-42.5
334200	C94	261	-38.5	.?704+03	.4015+03	-42.6
334300	C91	261	-38.7	.?692+03	.4000+03	-42.6
334400	C91	260	-38.9	.?680+03	.3985+03	-42.7
334500	C90	260	-39.0	.?668+03	.3970+03	-42.8
334600	C88	261	-39.2	.?657+03	.3956+03	-42.9
334700	C86	263	-39.4	.?645+03	.3941+03	-43.0
334800	C88	263	-39.6	.?633+03	.3926+03	-43.0
334900	C87	263	-39.7	.?622+03	.3912+03	-43.1

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
035000	087	264	-39.9	.2610+03	.3898+03	-43.2
035100	086	264	-40.1	.2598+03	.3884+03	-43.4
035200	087	265	-40.3	.2587+03	.3870+03	-43.6
035300	086	265	-40.6	.2575+03	.3857+03	-43.8
035400	086	264	-40.8	.2564+03	.3843+03	-44.0
035500	086	264	-41.0	.2553+03	.3830+03	-44.2
035600	086	264	-41.2	.2541+03	.3816+03	-44.5
035700	086	264	-41.4	.2530+03	.3803+03	-44.7
035800	085	264	-41.7	.2519+03	.3790+03	-44.9
035900	085	264	-41.9	.2507+03	.3776+03	-45.1
036000	086	263	-42.1	.2496+03	.3763+03	-45.3
036100	086	263	-42.3	.2485+03	.3750+03	-45.6
036200	087	262	-42.6	.2474+03	.3738+03	-45.9
036300	088	263	-42.8	.2463+03	.3725+03	-46.1
036400	088	262	-43.1	.2452+03	.3712+03	-46.4
036500	088	262	-43.3	.2441+03	.3699+03	-46.7
036600	088	262	-43.6	.2430+03	.3687+03	-47.0
036700	087	263	-43.8	.2419+03	.3674+03	-47.3
036800	086	262	-44.1	.2408+03	.3662+03	-47.5
036900	086	263	-44.3	.2397+03	.3649+03	-47.8
037000	086	263	-44.6	.2386+03	.3637+03	-48.1
037100	086	264	-44.9	.2375+03	.3624+03	-48.4
037200	085	263	-45.1	.2365+03	.3612+03	-48.7
037300	084	264	-45.4	.2354+03	.3600+03	-48.9
037400	084	264	-45.6	.2343+03	.3588+03	-49.2
037500	083	264	-45.9	.2333+03	.3575+03	-49.5
037600	083	264	-46.2	.2322+03	.3563+03	-49.8
037700	083	264	-46.4	.2311+03	.3551+03	-50.1
037800	083	264	-46.7	.2301+03	.3539+03	-50.3
037900	083	264	-46.9	.2290+03	.3527+03	-50.6
038000	083	263	-47.2	.2280+03	.3515+03	-50.9
038100	083	262	-47.5	.2270+03	.3503+03	-51.2
038200	081	263	-47.7	.2259+03	.3491+03	-51.5
038300	082	263	-48.0	.2249+03	.3479+03	-51.7
038400	082	263	-48.3	.2238+03	.3467+03	-52.0
038500	081	264	-48.5	.2228+03	.3456+03	-52.3
038600	082	265	-48.8	.2218+03	.3444+03	-52.6
038700	081	265	-49.1	.2208+03	.3432+03	-52.9
038800	080	265	-49.4	.2198+03	.3421+03	-53.1
038900	081	265	-49.6	.2187+03	.3409+03	-53.4
039000	081	264	-49.9	.2177+03	.3397+03	-53.7
039100	079	263	-50.2	.2167+03	.3386+03	-54.0
039200	077	262	-50.5	.2157+03	.3375+03	-54.3
039300	078	262	-50.8	.2147+03	.3363+03	-54.6
039400	077	261	-51.1	.2137+03	.3352+03	-54.9
039500	076	261	-51.3	.2127+03	.3341+03	-55.2
039600	074	261	-51.6	.2117+03	.3330+03	-55.5
039700	074	261	-51.9	.2107+03	.3318+03	-55.8
039800	073	261	-52.2	.2098+03	.3307+03	-56.1
039900	072	261	-52.5	.2088+03	.3296+03	-56.4

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
040000	071	260	-52.8	.2078+03	.3285+03	-56.7
040100	071	259	-53.0	.2068+03	.3273+03	-57.0
040200	072	259	-53.3	.2058+03	.3262+03	-57.2
040300	070	260	-53.5	.2049+03	.3250+03	-57.5
040400	070	260	-53.8	.2039+03	.3238+03	-57.7
040500	069	259	-54.0	.2029+03	.3227+03	-58.0
040600	069	258	-54.3	.2020+03	.3215+03	-58.3
040700	069	258	-54.5	.2010+03	.3204+03	-58.5
040800	069	259	-54.8	.2001+03	.3192+03	-58.8
040900	069	259	-55.0	.1991+03	.3181+03	-59.0
041000	070	258	-55.3	.1982+03	.3169+03	-59.3
041100	071	257	-55.6	.1973+03	.3159+03	-59.6
041200	072	257	-56.0	.1963+03	.3149+03	-60.0
041300	073	257	-56.3	.1954+03	.3139+03	-60.3
041400	073	258	-56.6	.1945+03	.3128+03	-60.7
041500	072	257	-56.9	.1935+03	.3118+03	-61.0
041600	072	256	-57.3	.1926+03	.3108+03	-61.4
041700	072	255	-57.6	.1917+03	.3098+03	-61.7
041800	072	256	-57.9	.1908+03	.3088+03	-62.1
041900	072	254	-58.3	.1899+03	.3078+03	-62.4
042000	072	255	-58.6	.1890+03	.3068+03	-62.8
042100	075	254	-58.9	.1880+03	.3057+03	-9999.
042200	075	255	-59.2	.1871+03	.3046+03	-9999.
042300	075	255	-59.4	.1862+03	.3036+03	-9999.
042400	074	254	-59.7	.1853+03	.3025+03	-9999.
042500	075	253	-60.0	.1844+03	.3014+03	-9999.
042600	076	253	-60.3	.1835+03	.3004+03	-9999.
042700	075	253	-60.6	.1826+03	.2993+03	-9999.
042800	076	253	-60.8	.1818+03	.2982+03	-9999.
042900	076	252	-61.1	.1809+03	.2972+03	-9999.
043000	077	252	-61.4	.1800+03	.2961+03	-9999.
043100	079	253	-61.6	.1791+03	.2950+03	-9999.
043200	080	254	-61.9	.1782+03	.2939+03	-9999.
043300	081	255	-62.1	.1774+03	.2928+03	-9999.
043400	082	255	-62.3	.1765+03	.2916+03	-9999.
043500	083	256	-62.5	.1756+03	.2905+03	-9999.
043600	085	257	-62.8	.1748+03	.2894+03	-9999.
043700	088	257	-63.0	.1739+03	.2883+03	-9999.
043800	088	257	-63.2	.1731+03	.2872+03	-9999.
043900	088	257	-63.5	.1722+03	.2861+03	-9999.
044000	089	257	-63.7	.1714+03	.2850+03	-9999.
044100	091	258	-63.9	.1705+03	.2839+03	-9999.
044200	090	258	-64.2	.1697+03	.2829+03	-9999.
044300	089	257	-64.4	.1688+03	.2818+03	-9999.
044400	089	257	-64.7	.1680+03	.2807+03	-9999.
044500	090	256	-64.9	.1672+03	.2796+03	-9999.
044600	090	256	-65.1	.1663+03	.2786+03	-9999.
044700	090	256	-65.4	.1655+03	.2775+03	-9999.
044800	091	256	-65.6	.1647+03	.2765+03	-9999.
044900	092	255	-65.9	.1639+03	.2754+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
045000	093	255	-66.1	.1631+03	.2744+03	-9999.
045100	095	256	-66.4	.1622+03	.2734+03	-9999.
045200	099	257	-66.7	.1614+03	.2724+03	-9999.
045300	102	258	-67.0	.1606+03	.2714+03	-9999.
045400	104	259	-67.3	.1598+03	.2705+03	-9999.
045500	106	260	-67.6	.1590+03	.2695+03	-9999.
045600	107	262	-67.9	.1582+03	.2685+03	-9999.
045700	109	263	-68.2	.1574+03	.2676+03	-9999.
045800	109	263	-68.5	.1566+03	.2666+03	-9999.
045900	109	263	-68.8	.1558+03	.2657+03	-9999.
046000	110	263	-69.1	.1551+03	.2647+03	-9999.
046100	110	263	-69.2	.1543+03	.2635+03	-9999.
046200	109	263	-69.2	.1535+03	.2622+03	-9999.
046300	109	261	-69.3	.1527+03	.2610+03	-9999.
046400	108	259	-69.4	.1519+03	.2598+03	-9999.
046500	108	257	-69.4	.1512+03	.2585+03	-9999.
046600	109	255	-69.5	.1504+03	.2573+03	-9999.
046700	111	254	-69.6	.1496+03	.2561+03	-9999.
046800	112	254	-69.7	.1489+03	.2549+03	-9999.
046900	114	253	-69.7	.1481+03	.2537+03	-9999.
047000	116	252	-69.8	.1474+03	.2525+03	-9999.
047100	117	252	-69.9	.1466+03	.2513+03	-9999.
047200	116	251	-69.9	.1459+03	.2501+03	-9999.
047300	117	251	-70.0	.1451+03	.2489+03	-9999.
047400	117	251	-70.0	.1444+03	.2477+03	-9999.
047500	117	250	-70.1	.1437+03	.2465+03	-9999.
047600	115	250	-70.2	.1429+03	.2453+03	-9999.
047700	112	252	-70.2	.1422+03	.2441+03	-9999.
047800	110	252	-70.3	.1415+03	.2430+03	-9999.
047900	108	252	-70.3	.1408+03	.2418+03	-9999.
048000	105	253	-70.4	.1401+03	.2407+03	-9999.
048100	101	255	-70.2	.1394+03	.2392+03	-9999.
048200	098	257	-70.1	.1386+03	.2378+03	-9999.
048300	097	258	-69.9	.1379+03	.2364+03	-9999.
048400	096	257	-69.7	.1372+03	.2350+03	-9999.
048500	092	256	-69.6	.1366+03	.2336+03	-9999.
048600	088	256	-69.4	.1359+03	.2323+03	-9999.
048700	084	256	-69.2	.1352+03	.2309+03	-9999.
048800	083	257	-69.0	.1345+03	.2295+03	-9999.
048900	081	256	-68.9	.1338+03	.2282+03	-9999.
049000	078	257	-68.7	.1331+03	.2268+03	-9999.
049100	075	255	-68.7	.1325+03	.2257+03	-9999.
049200	075	255	-68.7	.1318+03	.2246+03	-9999.
049300	077	255	-68.7	.1311+03	.2234+03	-9999.
049400	079	254	-68.7	.1305+03	.2223+03	-9999.
049500	081	254	-68.7	.1298+03	.2212+03	-9999.
049600	080	251	-68.7	.1291+03	.2201+03	-9999.
049700	079	251	-68.7	.1285+03	.2189+03	-9999.
049800	077	251	-68.7	.1278+03	.2178+03	-9999.
049900	076	251	-68.7	.1272+03	.2167+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
050000	077	249	-68.7	.1266+03	.2156+03	-9999.
050100	080	250	-68.8	.1259+03	.2147+03	-9999.
050200	081	250	-69.0	.1253+03	.2137+03	-9999.
050300	081	249	-69.1	.1246+03	.2128+03	-9999.
050400	082	250	-69.2	.1240+03	.2118+03	-9999.
050500	082	252	-69.3	.1234+03	.2109+03	-9999.
050600	080	251	-69.5	.1228+03	.2100+03	-9999.
050700	078	252	-69.6	.1221+03	.2090+03	-9999.
050800	077	251	-69.7	.1215+03	.2081+03	-9999.
050900	075	249	-69.9	.1209+03	.2072+03	-9999.
051000	074	247	-70.0	.1203+03	.2063+03	-9999.
051100	074	247	-70.1	.1197+03	.2053+03	-9999.
051200	076	245	-70.2	.1191+03	.2044+03	-9999.
051300	074	245	-70.4	.1185+03	.2035+03	-9999.
051400	074	247	-70.5	.1179+03	.2026+03	-9999.
051500	074	249	-70.6	.1173+03	.2017+03	-9999.
051600	074	249	-70.7	.1167+03	.2008+03	-9999.
051700	072	249	-70.8	.1161+03	.1999+03	-9999.
051800	071	247	-71.0	.1155+03	.1990+03	-9999.
051900	071	248	-71.1	.1149+03	.1981+03	-9999.
052000	070	248	-71.2	.1143+03	.1972+03	-9999.
052100	068	248	-71.3	.1137+03	.1963+03	-9999.
052200	067	249	-71.4	.1131+03	.1954+03	-9999.
052300	067	249	-71.5	.1126+03	.1945+03	-9999.
052400	067	249	-71.6	.1120+03	.1936+03	-9999.
052500	067	249	-71.7	.1114+03	.1927+03	-9999.
052600	066	249	-71.9	.1108+03	.1918+03	-9999.
052700	065	250	-72.0	.1103+03	.1910+03	-9999.
052800	064	248	-72.1	.1097+03	.1901+03	-9999.
052900	062	245	-72.2	.1091+03	.1892+03	-9999.
053000	059	242	-72.3	.1086+03	.1883+03	-9999.
053100	057	239	-72.4	.1080+03	.1875+03	-9999.
053200	057	236	-72.5	.1075+03	.1866+03	-9999.
053300	057	233	-72.7	.1069+03	.1858+03	-9999.
053400	058	234	-72.8	.1064+03	.1849+03	-9999.
053500	059	230	-72.9	.1058+03	.1841+03	-9999.
053600	058	229	-73.0	.1053+03	.1833+03	-9999.
053700	057	229	-73.1	.1047+03	.1824+03	-9999.
053800	059	227	-73.3	.1042+03	.1816+03	-9999.
053900	059	226	-73.4	.1037+03	.1808+03	-9999.
054000	059	225	-73.5	.1031+03	.1800+03	-9999.
054100	061	224	-73.6	.1026+03	.1791+03	-9999.
054200	062	224	-73.6	.1021+03	.1782+03	-9999.
054300	061	225	-73.7	.1015+03	.1773+03	-9999.
054400	060	223	-73.7	.1010+03	.1765+03	-9999.
054500	058	222	-73.8	.1005+03	.1756+03	-9999.
054600	057	224	-73.9	.9997+02	.1748+03	-9999.
054700	056	224	-73.9	.9945+02	.1739+03	-9999.
054800	055	223	-74.0	.9894+02	.1731+03	-9999.
054900	056	222	-74.0	.9843+02	.1722+03	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GPAM/M3)	DEW POINT (DEG C)
055000	058	223	-74.1	.9792+02	.1714+03	-9999.
055100	060	224	-74.3	.9741+02	.1707+03	-9999.
055200	062	223	-74.5	.9690+02	.1699+03	-9999.
055300	062	224	-74.7	.9640+02	.1692+03	-9999.
055400	061	226	-74.9	.9590+02	.1685+03	-9999.
055500	061	229	-75.1	.9540+02	.1678+03	-9999.
055600	061	231	-75.3	.9490+02	.1671+03	-9999.
055700	061	234	-75.5	.9441+02	.1664+03	-9999.
055800	062	237	-75.7	.9392+02	.1657+03	-9999.
055900	060	237	-75.9	.9343+02	.1650+03	-9999.
056000	056	238	-76.1	.9294+02	.1643+03	-9999.
056100	051	240	-76.2	.9245+02	.1635+03	-9999.
056200	047	242	-76.3	.9197+02	.1627+03	-9999.
056300	045	247	-76.3	.9149+02	.1619+03	-9999.
056400	044	252	-76.4	.9101+02	.1612+03	-9999.
056500	044	254	-76.5	.9053+02	.1604+03	-9999.
056600	041	256	-76.6	.9005+02	.1596+03	-9999.
056700	038	258	-76.7	.8958+02	.1588+03	-9999.
056800	038	261	-76.7	.8911+02	.1581+03	-9999.
056900	038	258	-76.8	.8864+02	.1573+03	-9999.
057000	036	256	-76.9	.8818+02	.1565+03	-9999.
058000	035	243	-75.9	.8367+02	.1478+03	-9999.
059000	033	243	-74.8	.7941+02	.1395+03	-9999.
060000	029	238	-74.4	.7538+02	.1321+03	-9999.
061000	027	230	-74.2	.7157+02	.1253+03	-9999.
062000	026	224	-73.5	.6795+02	.1186+03	-9999.
063000	025	220	-72.2	.6453+02	.1119+03	-9999.
064000	021	219	-70.3	.6131+02	.1053+03	-9999.
065000	012	216	-70.3	.5827+02	.1001+03	-9999.
066000	007	205	-68.1	.5539+02	.9410+02	-9999.
067000	005	192	-66.7	.5268+02	.8889+02	-9999.
068000	005	181	-67.2	.5011+02	.8476+02	-9999.
069000	006	199	-65.8	.4767+02	.8009+02	-9999.
070000	006	226	-63.5	.4537+02	.7539+02	-9999.
071000	006	257	-61.5	.4320+02	.7111+02	-9999.
072000	007	280	-62.4	.4115+02	.6738+02	-9999.
073000	009	295	-60.5	.3920+02	.6422+02	-9999.
074000	010	295	-61.0	.3734+02	.6132+02	-9999.
075000	012	293	-60.5	.3557+02	.5827+02	-9999.
076000	014	291	-59.5	.3389+02	.5526+02	-9999.
077000	017	292	-59.0	.3229+02	.5253+02	-9999.
078000	018	294	-57.7	.3078+02	.4977+02	-9999.
079000	019	293	-57.5	.2934+02	.4740+02	-9999.
080000	019	289	-58.1	.2797+02	.4531+02	-9999.
081000	018	278	-57.9	.2666+02	.4315+02	-9999.
082000	019	268	-57.1	.2542+02	.4099+02	-9999.
083000	020	260	-56.1	.2423+02	.3889+02	-9999.
084000	023	253	-54.5	.2311+02	.3682+02	-9999.
085000	026	253	-55.0	.2205+02	.3521+02	-9999.
086000	029	254	-55.0	.2103+02	.3358+02	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
087000	033	257	-54.8	.2006+02	.3200+02	-9999.
088000	038	260	-54.9	.1914+02	.3055+02	-9999.
089000	042	265	-53.1	.1826+02	.2891+02	-9999.
090000	044	268	-51.3	.1743+02	.2737+02	-9999.
091000	045	269	-50.1	.1664+02	.2599+02	-9999.
092000	045	270	-50.2	.1589+02	.2483+02	-9999.
093000	044	268	-50.6	.1517+02	.2375+02	-9999.
094000	044	265	-51.1	.1448+02	.2272+02	-9999.
095000	045	260	-50.9	.1383+02	.2168+02	-9999.
096000	047	257	-50.8	.1320+02	.2068+02	-9999.
097000	050	256	-51.1	.1260+02	.1977+02	-9999.
098000	055	256	-51.6	.1203+02	.1892+02	-9999.
099000	059	260	-52.1	.1148+02	.1809+02	-9999.
100000	064	264	-52.0	.1096+02	.1727+02	-9999.
101000	067	271	-52.0	.1046+02	.1648+02	-9999.
102000	069	276	-51.9	.9986+01	.1573+02	-9999.
103000	069	275	-51.3	.9533+01	.1497+02	-9999.
104000	072	269	-50.6	.9102+01	.1424+02	-9999.
105000	084	261	-49.8	.8691+01	.1356+02	-9999.
106000	103	257	-49.1	.8301+01	.1291+02	-9999.
107000	109	265	-48.4	.7929+01	.1229+02	-9999.
108000	111	274	-47.8	.7575+01	.1171+02	-9999.
109000	103	280	-47.2	.7237+01	.1116+02	-9999.
110000	096	284	-46.5	.6915+01	.1063+02	-9999.
111000	094	285	-45.9	.6609+01	.1013+02	-9999.
112000	097	289	-45.3	.6317+01	.9659+01	-9999.
113000	099	288	-44.7	.6039+01	.9209+01	-9999.
114000	087	290	-43.9	.5774+01	.8775+01	-9999.
115000	079	293	-42.0	.5521+01	.8320+01	-9999.
116000	069	291	-40.3	.5282+01	.7903+01	-9999.
117000	064	289	-39.6	.5054+01	.7541+01	-9999.
118000	069	283	-39.1	.4837+01	.7200+01	-9999.
119000	074	277	-38.2	.4630+01	.6866+01	-9999.
120000	077	273	-36.6	.4433+01	.6529+01	-9999.
121000	082	269	-34.8	.4245+01	.6205+01	-9999.
122000	087	268	-33.7	.4066+01	.5916+01	-9999.
123000	084	269	-33.4	.3895+01	.5660+01	-9999.
124000	081	266	-33.2	.3732+01	.5419+01	-9999.
125000	086	265	-32.9	.3576+01	.5184+01	-9999.
126000	094	265	-31.8	.3427+01	.4946+01	-9999.
127000	106	263	-30.2	.3284+01	.4709+01	-9999.
128000	116	261	-28.6	.3149+01	.4485+01	-9999.
129000	121	262	-27.0	.3020+01	.4274+01	-9999.
130000	126	263	-25.4	.2897+01	.4074+01	-9999.
131000	131	262	-23.9	.2780+01	.3885+01	-9999.
132000	136	261	-22.5	.2668+01	.3707+01	-9999.
133000	136	263	-20.3	.2561+01	.3529+01	-9999.
134000	135	265	-17.2	.2460+01	.3348+01	-9999.
135000	133	266	-13.5	.2364+01	.3172+01	-9999.
136000	133	267	-11.1	.2273+01	.3022+01	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
137000	135	267	-10.7	.2186+01	.2902+01	-9999.
138000	138	266	-11.5	.2102+01	.2798+01	-9999.
139000	141	263	-11.9	.2021+01	.2696+01	-9999.
140000	143	260	-11.2	.1943+01	.2584+01	-9999.
141000	146	259	-9.5	.1869+01	.2470+01	-9999.
142000	148	259	-8.8	.1798+01	.2370+01	-9999.
143000	152	259	-8.8	.1729+01	.2279+01	-9999.
144000	155	259	-8.7	.1664+01	.2192+01	-9999.
145000	160	259	-8.1	.1601+01	.2104+01	-9999.
146000	167	260	-6.7	.1540+01	.2014+01	-9999.
147000	173	260	-6.4	.1482+01	.1935+01	-9999.
148000	180	259	-7.0	.1426+01	.1866+01	-9999.
149000	184	257	-8.6	.1372+01	.1807+01	-9999.
150000	185	255	-9.5	.1320+01	.1745+01	-9999.
151000	187	255	-9.9	.1270+01	.1680+01	-9999.
152000	190	256	-9.6	.1221+01	.1614+01	-9999.
153000	195	257	-8.6	.1175+01	.1547+01	-9999.
154000	200	258	-7.8	.1130+01	.1484+01	-9999.
155000	207	259	-7.5	.1087+01	.1426+01	-9999.
156000	212	261	-7.8	.1046+01	.1374+01	-9999.
157000	219	262	-8.2	.1007+01	.1324+01	-9999.
158000	224	264	-8.4	.9684+00	.1274+01	-9999.
159000	229	266	-8.5	.9317+00	.1226+01	-9999.
160000	236	268	-8.2	.8964+00	.1179+01	-9999.
161000	241	269	-7.8	.8624+00	.1132+01	-9999.
162000	244	269	-7.3	.8298+00	.1087+01	-9999.
163000	246	269	-6.7	.7986+00	.1044+01	-9999.
164000	249	269	-6.2	.7685+00	.1003+01	-9999.
165000	249	268	-5.6	.7396+00	.9631+00	-9999.
166000	248	268	-5.1	.7119+00	.9250+00	-9999.
167000	244	266	-4.7	.6853+00	.8894+00	-9999.
168000	239	262	-4.7	.6597+00	.8562+00	-9999.
169000	233	257	-5.0	.6350+00	.8249+00	-9999.
170000	228	253	-5.3	.6112+00	.7950+00	-9999.
171000	226	248	-5.7	.5883+00	.7662+00	-9999.
172000	224	246	-6.0	.5663+00	.7385+00	-9999.
173000	226	246	-6.4	.5450+00	.7116+00	-9999.
174000	224	247	-6.7	.5245+00	.6858+00	-9999.
175000	224	250	-7.1	.5047+00	.6607+00	-9999.
176000	224	253	-7.6	.4857+00	.6371+00	-9999.
177000	224	255	-8.4	.4673+00	.6148+00	-9999.
178000	224	258	-9.4	.4496+00	.5939+00	-9999.
179000	221	259	-10.6	.4325+00	.5738+00	-9999.
180000	219	259	-11.7	.4160+00	.5543+00	-9999.
181000	219	260	-12.8	.4000+00	.5353+00	-9999.
182000	217	259	-13.7	.3846+00	.5164+00	-9999.
183000	219	258	-13.7	.3697+00	.4965+00	-9999.
184000	221	256	-13.5	.3555+00	.4770+00	-9999.
185000	222	255	-13.1	.3418+00	.4579+00	-9999.
186000	224	253	-12.5	.3286+00	.4392+00	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
187000	226	253	-12.0	.3160+00	.4216+00	-9999.
188000	229	253	-11.7	.3039+00	.4049+00	-9999.
189000	229	253	-11.8	.2923+00	.3897+00	-9999.
190000	229	251	-12.2	.2811+00	.3753+00	-9999.
191000	224	249	-12.9	.2703+00	.3618+00	-9999.
192000	221	246	-13.6	.2599+00	.3488+00	-9999.
193000	217	243	-14.3	.2498+00	.3361+00	-9999.
194000	212	240	-14.9	.2402+00	.3240+00	-9999.
195000	207	238	-15.5	.2309+00	.3122+00	-9999.
196000	204	236	-16.1	.2219+00	.3007+00	-9999.
197000	202	235	-17.0	.2132+00	.2900+00	-9999.
198000	200	235	-18.3	.2049+00	.2801+00	-9999.
199000	199	237	-19.8	.1968+00	.2706+00	-9999.
200000	197	240	-21.5	.1890+00	.2617+00	-9999.
201000	197	244	-23.3	.1815+00	.2531+00	-9999.
202000	197	250	-25.2	.1742+00	.2447+00	-9999.
203000	197	255	-27.2	.1672+00	.2368+00	-9999.
204000	199	260	-29.3	.1604+00	.2292+00	-9999.
205000	199	263	-30.9	.1538+00	.2211+00	-9999.
206000	197	266	-31.8	.1474+00	.2128+00	-9999.
207000	194	269	-32.3	.1413+00	.2044+00	-9999.
208000	189	271	-31.9	.1355+00	.1957+00	-9999.
209000	184	273	-31.5	.1299+00	.1873+00	-9999.
210000	175	273	-31.0	.1245+00	.1791+00	-9999.
211000	165	274	-30.4	.1194+00	.1714+00	-9999.
212000	155	273	-30.3	.1145+00	.1643+00	-9999.
213000	145	270	-30.5	.1098+00	.1577+00	-9999.
214000	135	267	-31.7	.1052+00	.1518+00	-9999.
215000	133	263	-34.5	.1008+00	.1471+00	-9999.
216000	126	256	-36.6	.9640-01	.1420+00	-9999.
217000	123	249	-39.2	.9240-01	.1376+00	-9999.
218000	121	241	-40.6	.8840-01	.1324+00	-9999.
219000	123	236	-42.9	.8460-01	.1280+00	-9999.
220000	123	232	-46.0	.8090-01	.1241+00	-9999.
221000	123	230	-49.8	.7740-01	.1207+00	-9999.
222000	121	230	-53.0	.7390-01	.1169+00	-9999.
223000	116	231	-56.2	.7060-01	.1133+00	-9999.
224000	111	232	-58.9	.6740-01	.1096+00	-9999.
225000	106	235	-62.0	.6420-01	.1059+00	-9999.
226000	099	238	-64.0	.6100-01	.1016+00	-9999.
227000	094	241	-67.1	.5800-01	.9804-01	-9999.
228000	089	245	-70.1	.5510-01	.9453-01	-9999.
229000	087	248	-73.1	.5240-01	.9127-01	-9999.
230000	084	251	-75.2	.4990-01	.8781-01	-9999.
231000	084	253	-78.2	.4740-01	.8471-01	-9999.
232000	082	254	-80.3	.4500-01	.8128-01	-9999.
233000	084	256	-82.2	.4270-01	.7792-01	-9999.
234000	084	256	-83.2	.4050-01	.7426-01	-9999.
235000	086	257	-83.2	.3840-01	.7041-01	-9999.
236000	089	258	-83.2	.3640-01	.6674-01	-9999.

TABLE 4. (Continued)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
237000	089	258	-81.8	.3450-01	.6280-01	-9999.
238000	092	258	-79.4	.3280-01	.5899-01	-9999.
239000	092	258	-76.9	.3110-01	.5521-01	-9999.
240000	094	258	-74.6	.2960-01	.5194-01	-9999.
241000	094	257	-71.6	.2810-01	.4856-01	-9999.
242000	094	257	-68.5	.2670-01	.4546-01	-9999.
243000	094	257	-65.5	.2550-01	.4278-01	-9999.
244000	092	256	-62.5	.2430-01	.4018-01	-9999.
245000	092	256	-59.4	.2310-01	.3765-01	-9999.
246000	092	256	-57.3	.2210-01	.3566-01	-9999.
247000	091	256	-55.7	.2110-01	.3381-01	-9999.
248000	091	256	-55.2	.2010-01	.3212-01	-9999.
249000	089	256	-54.2	.1920-01	.3054-01	-9999.
250000	089	256	-53.2	.1830-01	.2898-01	-9999.
251000	087	256	-54.2	.1750-01	.2784-01	-9999.
252000	087	257	-54.2	.1670-01	.2657-01	-9999.
253000	086	258	-54.2	.1590-01	.2529-01	-9999.
254000	086	258	-55.2	.1520-01	.2429-01	-9999.
255000	084	259	-55.8	.1450-01	.2324-01	-9999.
256000	084	260	-58.3	.1380-01	.2237-01	-9999.
257000	082	262	-60.5	.1320-01	.2162-01	-9999.
258000	082	263	-63.3	.1260-01	.2092-01	-9999.
259000	082	265	-64.9	.1200-01	.2007-01	-9999.
260000	082	267	-66.6	.1140-01	.1923-01	-9999.
261000	081	268	-68.9	.1090-01	.1859-01	-9999.
262000	081	270	-70.4	.1030-01	.1770-01	-9999.
263000	081	272	-71.2	.9800-02	.1690-01	-9999.
264000	081	275	-72.2	.9300-02	.1612-01	-9999.
265000	081	277	-73.0	.8900-02	.1549-01	-9999.
266000	079	279	-73.2	.8500-02	.1481-01	-9999.
267000	079	281	-73.2	.8000-02	.1393-01	-9999.
268000	079	284	-73.2	.7600-02	.1324-01	-9999.
269000	079	286	-73.5	.7300-02	.1274-01	-9999.
270000	079	289	-74.0	.6900-02	.1207-01	-9999.
271000	079	292	-74.5	.6600-02	.1157-01	-9999.
272000	075	291	-74.7	.6303-02	.1105-01	-9999.
273000	070	291	-74.9	.6019-02	.1056-01	-9999.
274000	066	290	-75.1	.5748-02	.1008-01	-9999.
275000	062	290	-75.3	.5489-02	.9626-02	-9999.
276000	057	289	-75.4	.5242-02	.9193-02	-9999.
277000	053	288	-75.6	.5006-02	.8779-02	-9999.
278000	049	288	-75.8	.4781-02	.8384-02	-9999.
279000	045	287	-76.0	.4565-02	.8006-02	-9999.
280000	040	285	-76.2	.4360-02	.7646-02	-9999.
281000	036	284	-76.4	.4164-02	.7302-02	-9999.
282000	032	282	-76.6	.3976-02	.6973-02	-9999.
283000	028	279	-76.8	.3797-02	.6659-02	-9999.
284000	024	276	-76.9	.3626-02	.6359-02	-9999.
285000	020	271	-77.1	.3463-02	.6073-02	-9999.
286000	016	265	-77.3	.3307-02	.5799-02	-9999.

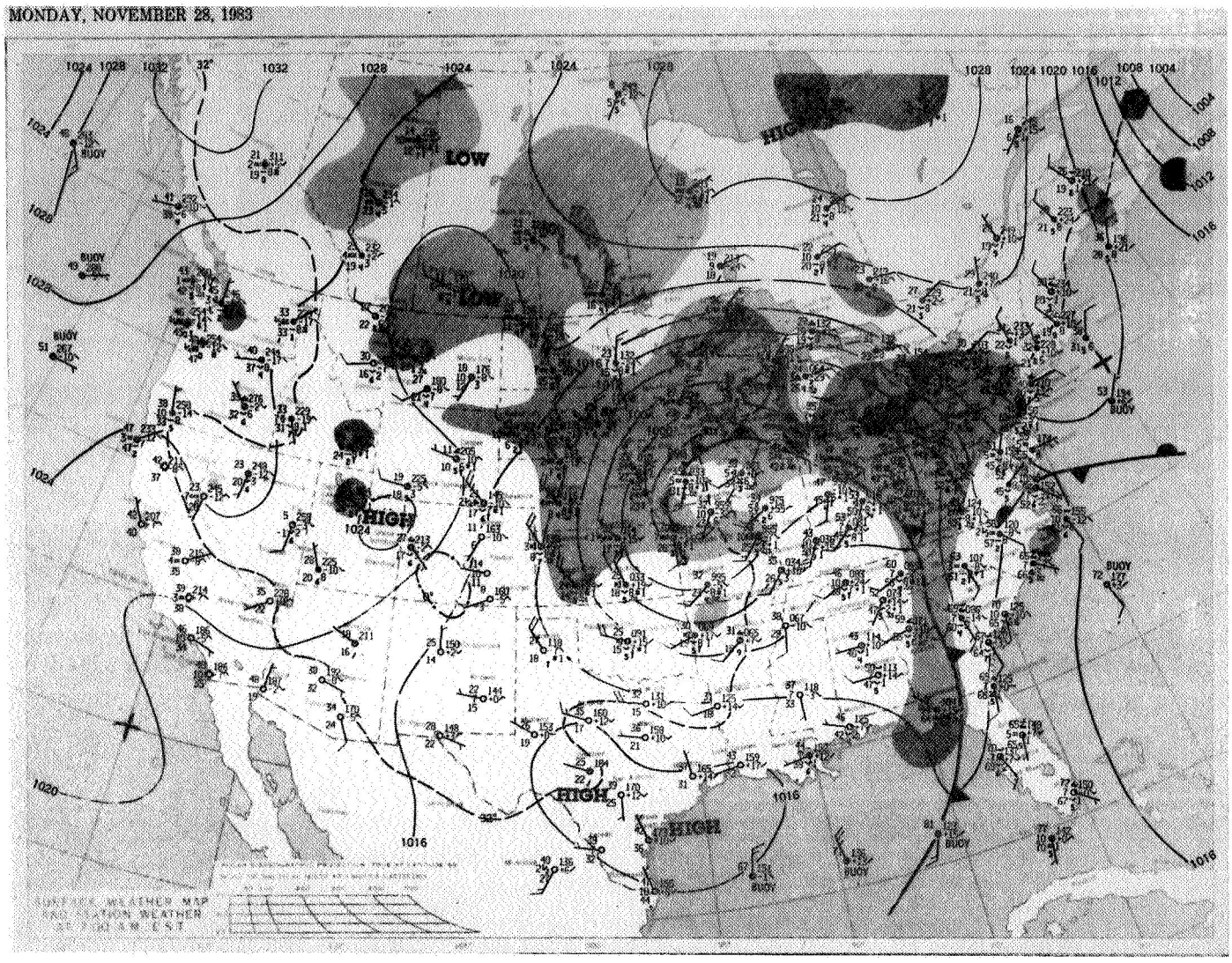
TABLE 4. (Concluded)

ALTITUDE (FT)	WIND SPEED (FT/SEC)	WIND DIRECTION (DEG)	TEMPERATURE (DEG C)	PRESSURE (MILLIBARS)	DENSITY (GRAM/M3)	DEW POINT (DEG C)
289000	006	295	-77.9	.2834-02	.5066-02	-9999.
292000	008	034	-78.5	.2428-02	.4358-02	-9999.
295000	018	954	-79.1	.2081-02	.3749-02	-9999.
298000	028	289	-78.5	.1694-02	.3028-02	-9999.
301000	074	275	-77.3	.1449-02	.2569-02	-9999.
304000	117	272	-76.1	.1239-02	.2180-02	-9999.
307000	150	271	-75.0	.1060-02	.1849-02	-9999.
310000	163	270	-73.8	.9064-03	.1569-02	-9999.
313000	158	269	-72.2	.7776-03	.1332-02	-9999.
316000	157	269	-70.2	.6698-03	.1132-02	-9999.
319000	149	269	-68.1	.5769-03	.9625-03	-9999.
322000	135	269	-66.1	.4969-03	.8181-03	-9999.
325000	110	269	-64.0	.4278-03	.6954-03	-9999.
328000	073	268	-62.0	.3684-03	.5911-03	-9999.
331000	066	268	-59.1	.3181-03	.5021-03	-9999.
334000	057	267	-56.2	.2746-03	.4266-03	-9999.
337000	041	265	-53.2	.2370-03	.3623-03	-9999.
340000	019	256	-50.3	.2045-03	.3078-03	-9999.
343000	013	116	-47.4	.1765-03	.2615-03	-9999.
346000	033	097	-43.7	.1532-03	.2228-03	-9999.
349000	036	099	-39.3	.1338-03	.1904-03	-9999.
352000	040	101	-34.8	.1168-03	.1627-03	-9999.
355000	043	104	-30.3	.1019-03	.1390-03	-9999.
358000	046	108	-25.9	.8887-04	.1188-03	-9999.
361000	047	101	-21.4	.7755-04	.1016-03	-9999.
364000	049	105	-14.5	.6934-04	.8818-04	-9999.
367000	051	109	-7.7	.6196-04	.7654-04	-9999.
370000	052	114	-.9	.5532-04	.6644-04	-9999.
373000	053	121	5.9	.4936-04	.5767-04	-9999.
376000	055	129	12.8	.4402-04	.5005-04	-9999.
379000	044	118	20.6	.3965-04	.4376-04	-9999.
382000	042	124	29.5	.3610-04	.3856-04	-9999.
385000	040	130	38.7	.3298-04	.3409-04	-9999.
388000	040	136	48.2	.3021-04	.3023-04	-9999.
391000	039	143	58.0	.2776-04	.2689-04	-9999.
394000	040	150	68.0	.2559-04	.2399-04	-9999.
397000	041	157	78.2	.2365-04	.2147-04	-9999.
400000	043	164	88.5	.2191-04	.1927-04	-9999.

TABLE 5. SELECTED ATMOSPHERIC OBSERVATIONS FOR THE FLIGHT TESTS OF THE SPACE SHUTTLE VEHICLES

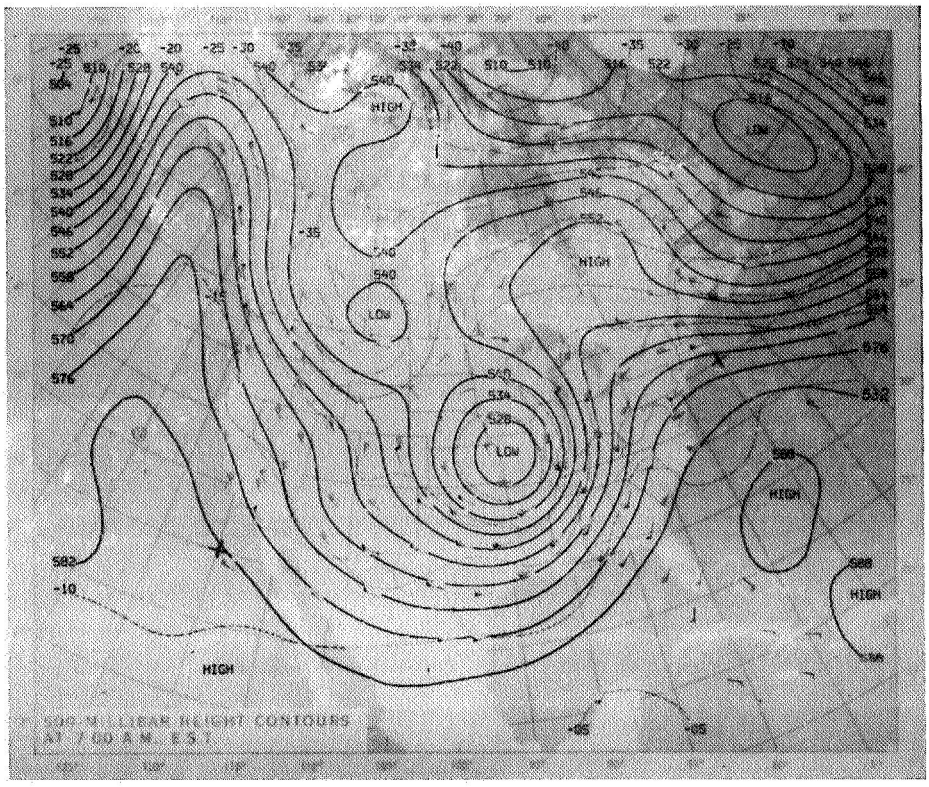
Vehicle Data					Surface Observations					Inflight Conditions Max. Wind Below 60,000 ft			Count Down and Launch Comments of Meteorological Significance
					Thermodynamic[a]			Wind[b]					
Seq. No.	Vehicle No.	Launch Date	Time[c] (EST) Nearest Minute	Launch Pad	Press[d] N/cm^2	Temp. (°C)	Rel. Hum. (%)	Speed (ft/sec)	Dir. (deg)	Alt. (ft)	Speed (ft/sec)	Dir. (deg)	
1	STS-1 Columbia	4/12/81	0700	39A	10.234[e]	21	82	11.8 15.2	125 120	44,300	98	250	
2	STS-2 Columbia	11/12/81	1010	39A	10.166	23	61	27.0 27.0	345 355	36,300	158	286	
3	STS-3 Columbia	3/22/82	1100	39A	10.160	24	71	7.0[f] 8.0[f]	50[f] 145[f]	45,000	119	250	Wind directional change observed at Pad just prior to L+0.[g]
4	STS-4 Columbia	6/27/82	1100[h]	39A	10.200	29	70	5.8[i] 4.9[i]	133[i] 141[i]	47,900	37	329	
5	STS-5 Columbia	11/11/82	0719	39A	10.227	22	68	22.0 35.0	90 90	40,600	146	336	
6	STS-6 Challenger	4/4/83	1330	39A	10.183	23	55	12.7 16.4	63 55	46,100	155	277	
7	STS-7 Challenger	6/18/83	0733[h]	39A	10.146	25	80	5.9[f] 10.3[f]	10[f] 350[f]	45,900	76	278	
8	STS-8 Challenger	8/30/83	0232[h]	39A	10.111	24	97	8.8 14.0	269 268	45,100	30	349	17 min countdown delay due to adverse weather conditions.
9	STS-9 Columbia	11/28/83	1100	39A	10.153	24	83	19.1 32.0	183 190	47,100	117	252	

a. Pad 39A thermodynamic measurements taken at approximately 1.2 m (4 ft) above natural grade at camera site No. 3.
b. 1 min average prior to L+0 of 60 ft PLP (listed first) and 275 ft FSS winds measured above natural grade.
c. Eastern Standard Time unless otherwise noted.
d. Pressure measurement applicable to 21 ft above MSL unless otherwise indicated.
e. Pressure measurement applicable to 14 ft above MSL.
f. 10 sec average prior to L+0.
g. Due to onset of sea breeze.
h. Eastern Daylight Time.
i. 30 sec average prior to L+0.
j. Spacelab 1



Surface Synoptic Map at 1200 UT November 28, 1983 – Isobaric, Frontal, and Precipitation Patterns are Shown in Standard Symbolic Form.

Figure 1. Surface synoptic chart 4 hr prior to launch of STS-9.



500 Millibar Height
Contours at 1200 UT
November 28, 1983.
Continuous Lines Indicate Height Contours In Feet Above Sea Level. Dashed Lines are Isotherms In Degrees Centigrade. Arrows Show Wind Direction and Speed at the 500 MB Level.

Figure 2. 500 mb map 4 hr prior to launch of STS-9.

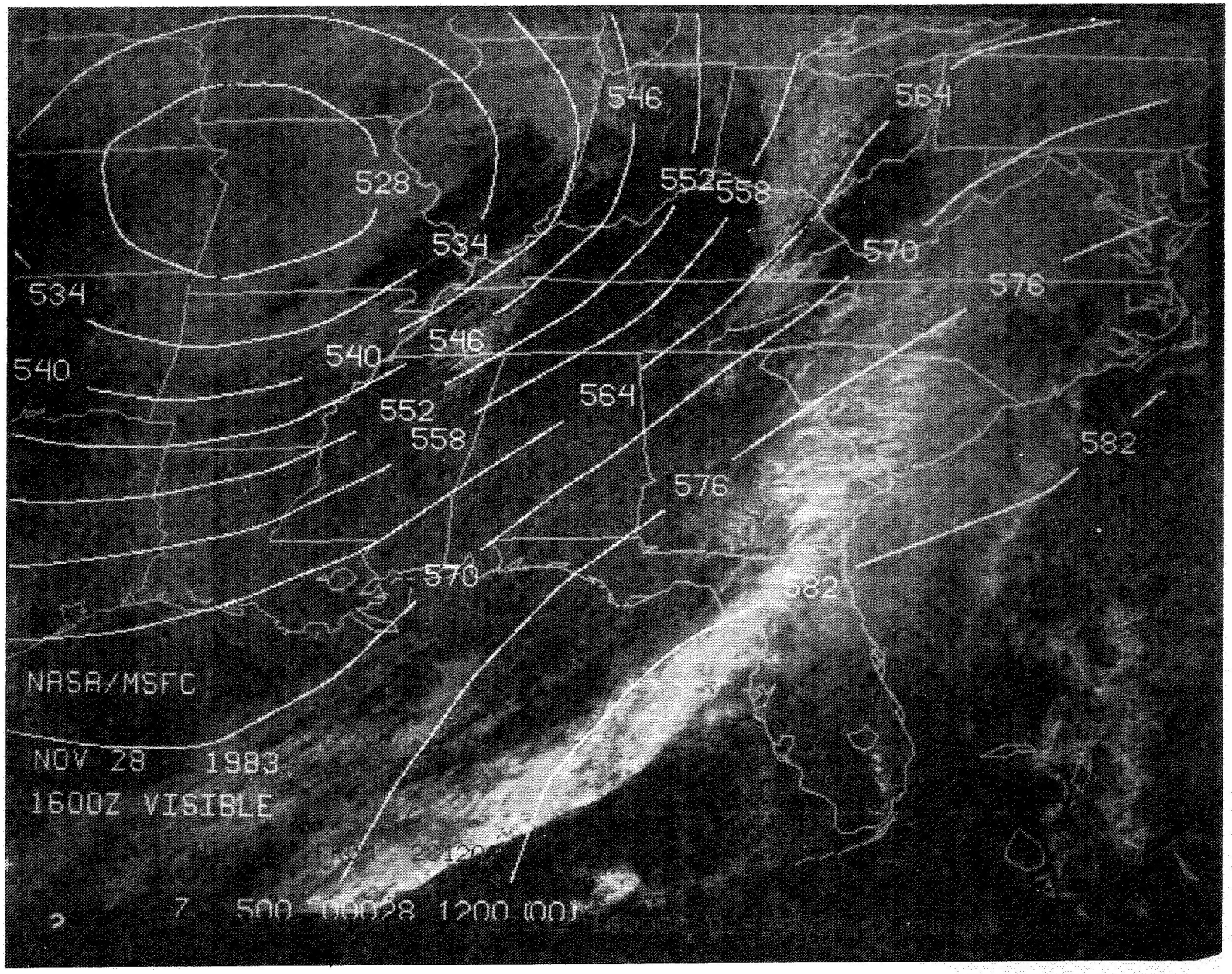


Figure 3. GOES-5 visible imagery of cloud cover at time of launch of STS-9 (1600 UT, November 28, 1983). 500-mb contours and wind barbs are also included for 1200 UT.

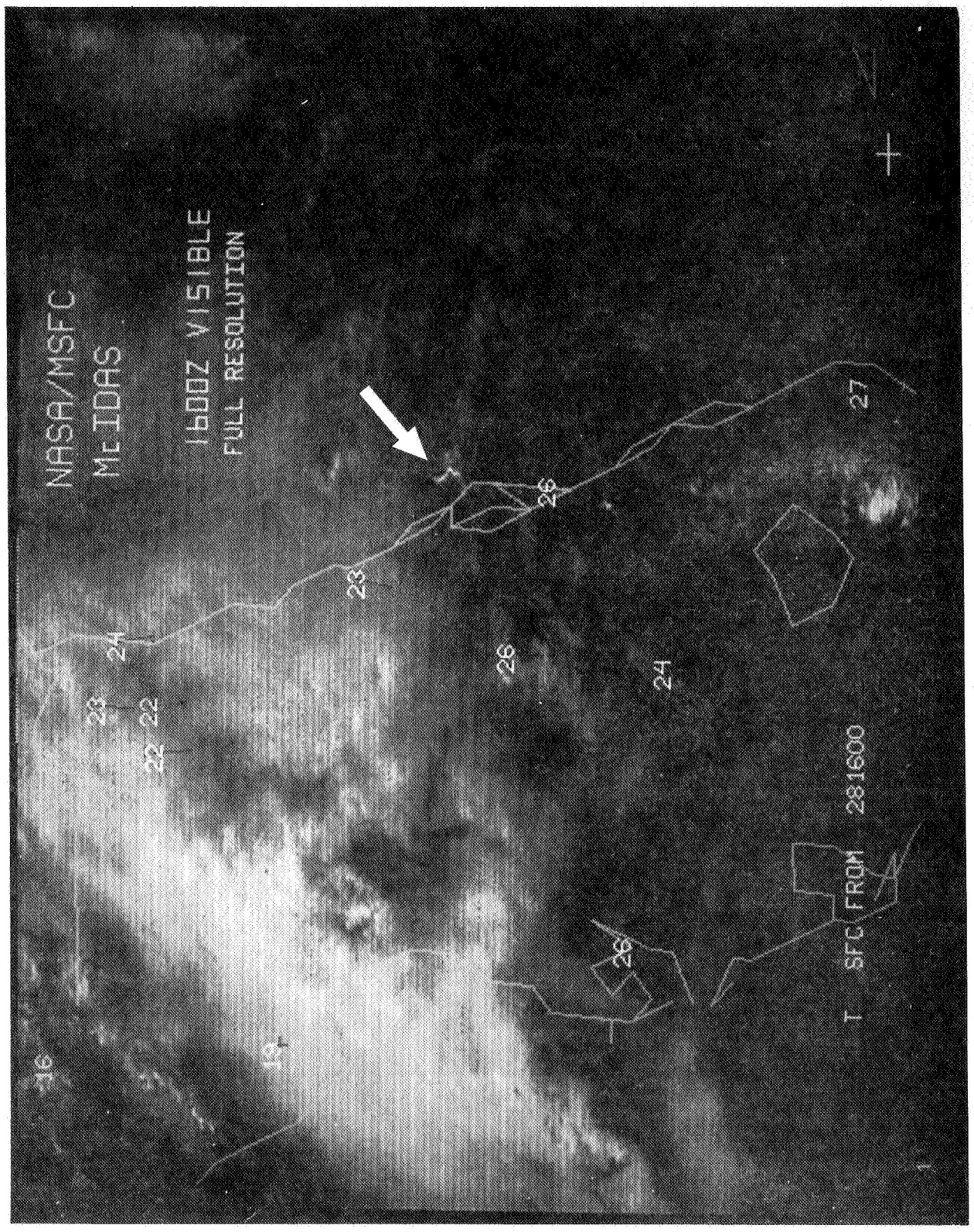


Figure 4. Enlarged view of GOES-5 visible imagery of cloud cover with exhaust trail visible (indicated by arrow) taken at time of launch of STS-9 (1600 UT, November 28, 1983). Surface temperatures and wind barbs for 1600 UT are also included.

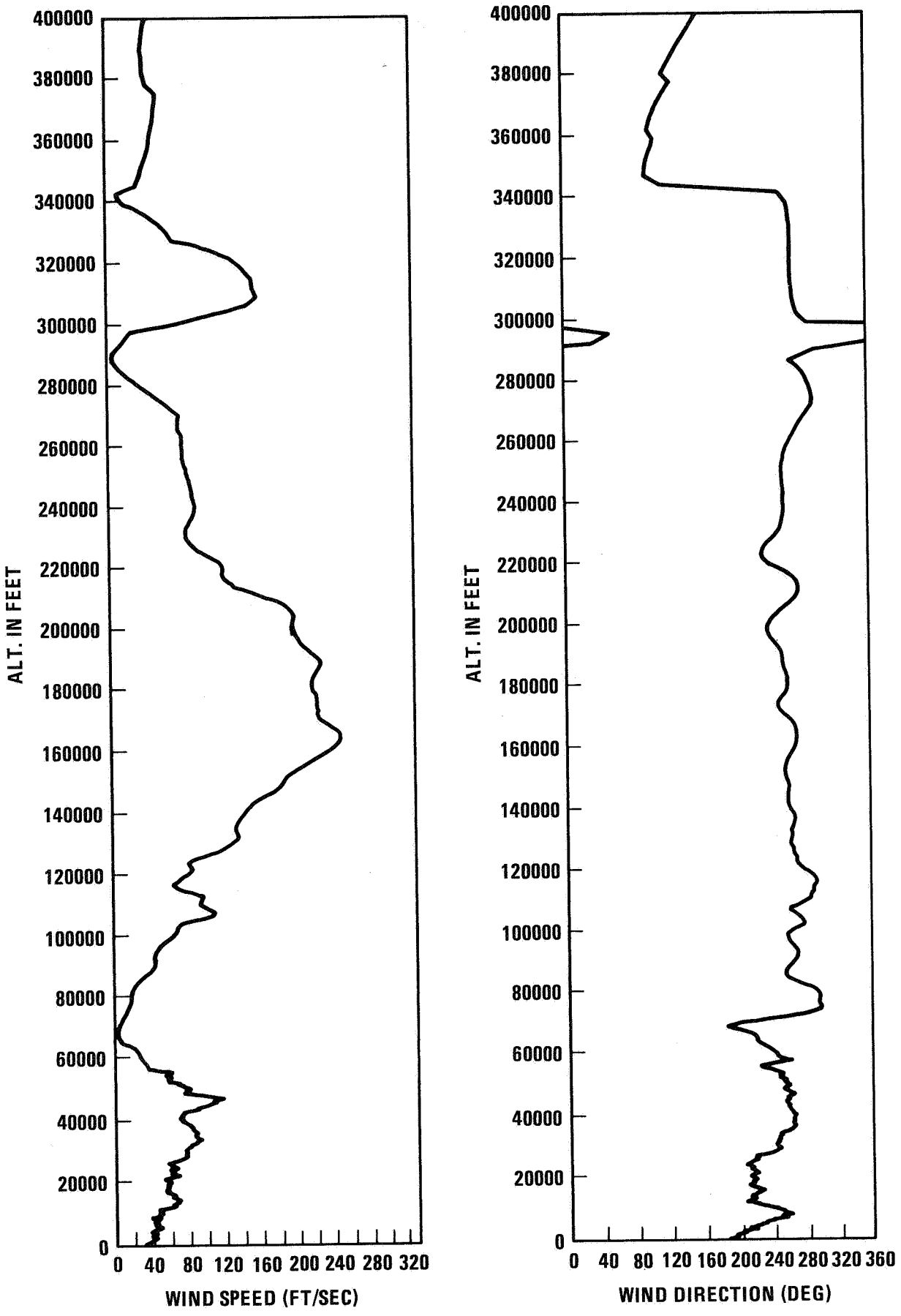


Figure 5. Scalar wind speed and direction at launch time of STS-9.

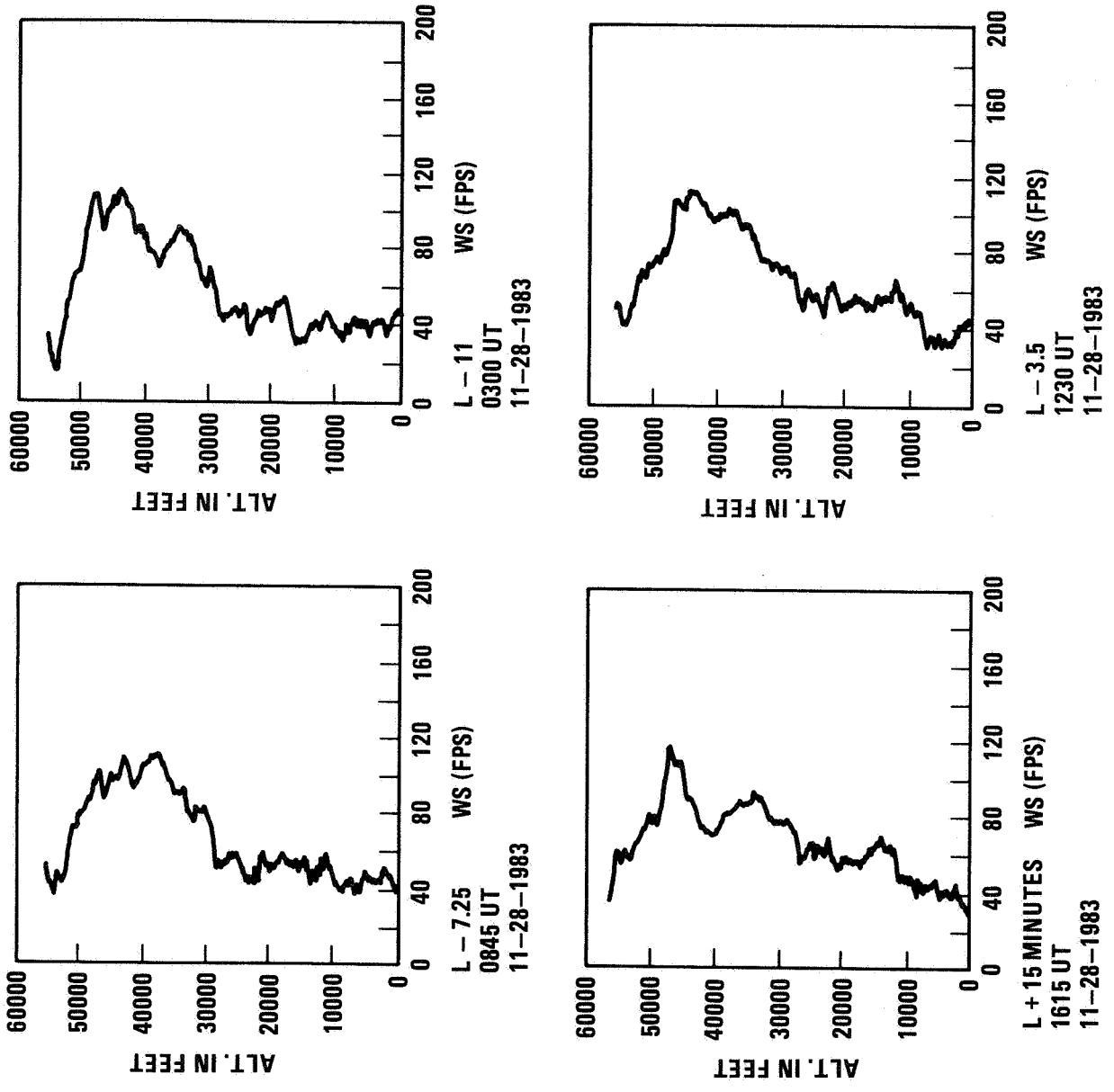


Figure 6. STS-9 prelaunch/launch Jimsphere-measured wind speeds (FPS).

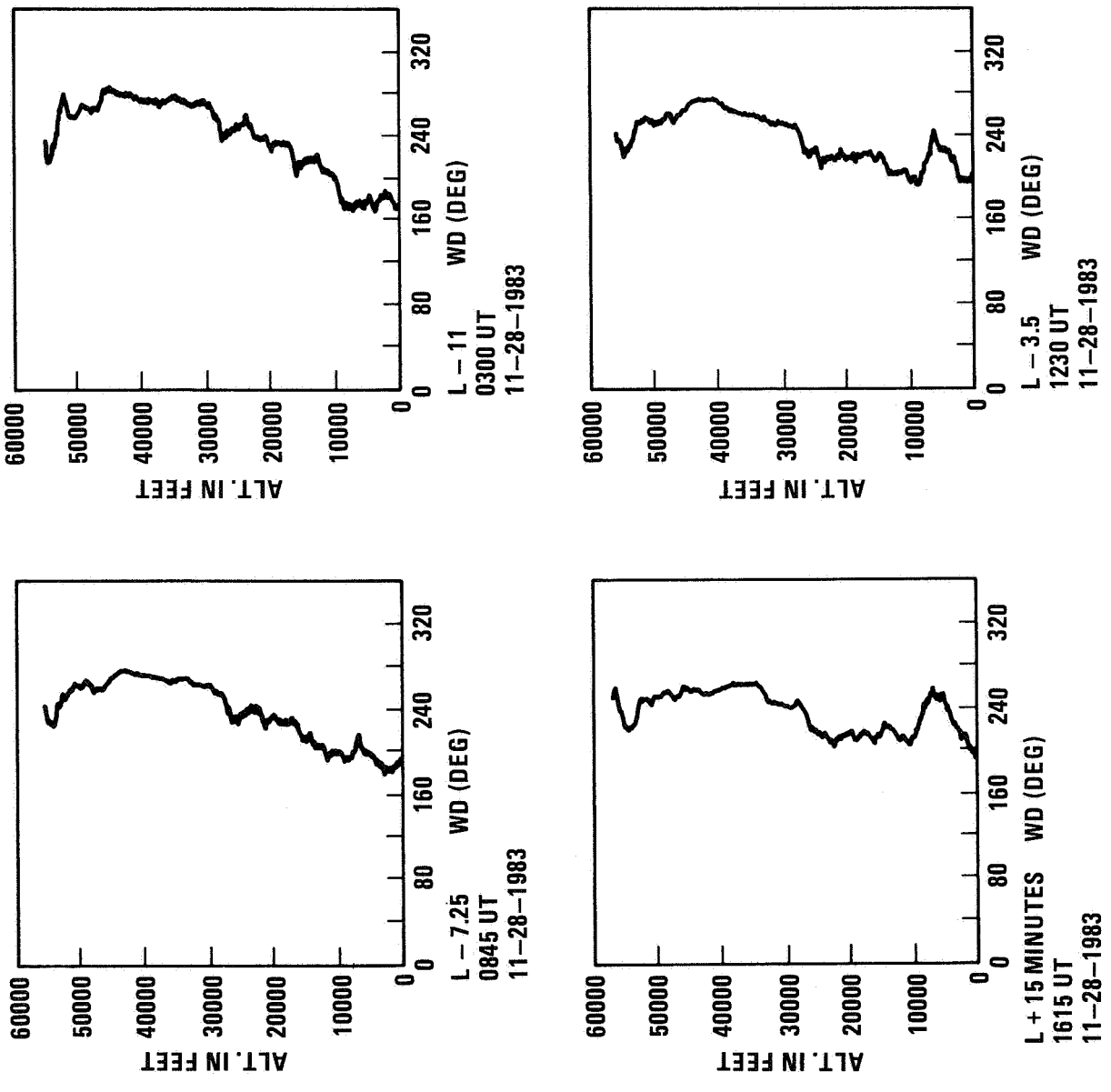


Figure 7. STS-9 prelaunch/launch Jimsphere-measured wind directions (degrees).

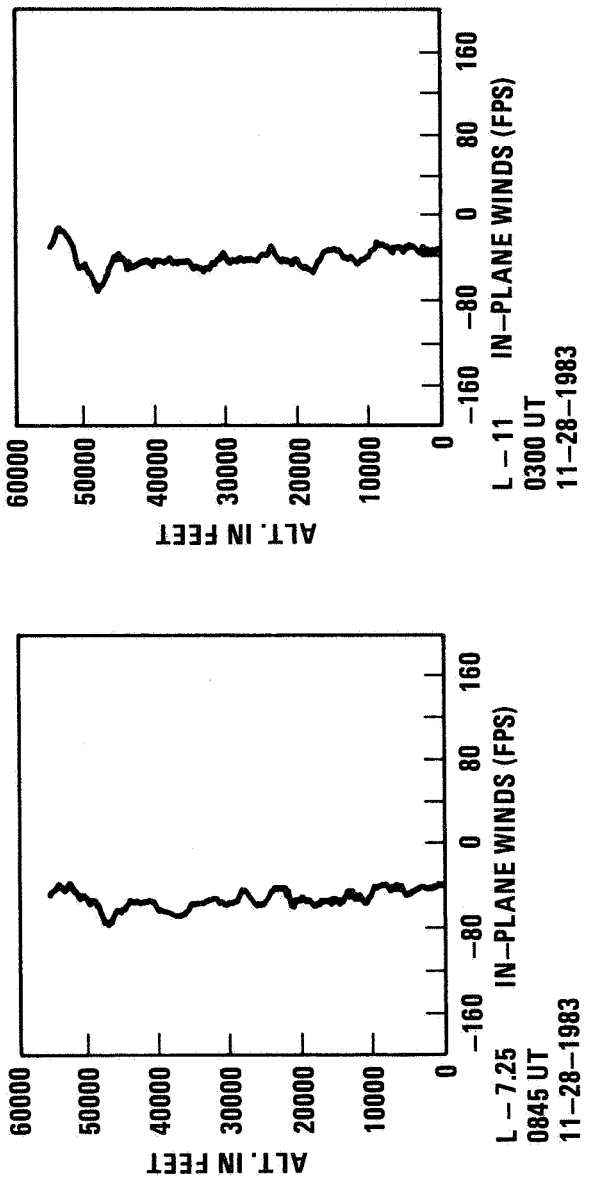
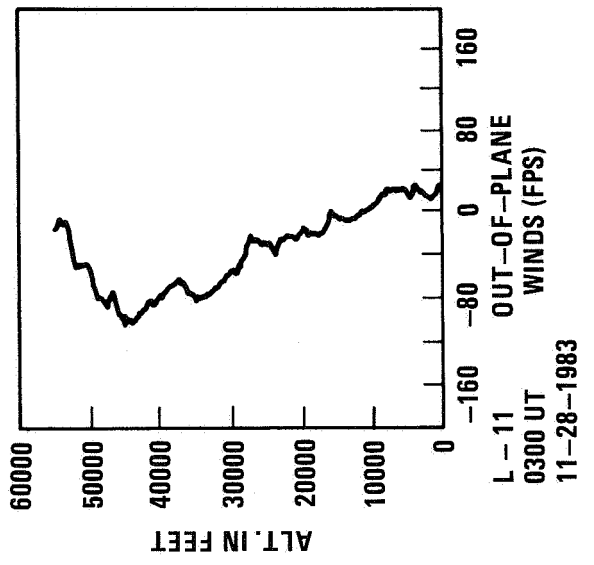
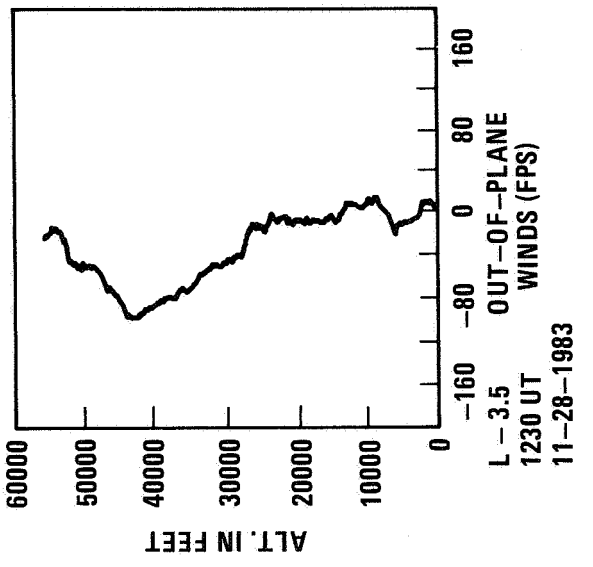
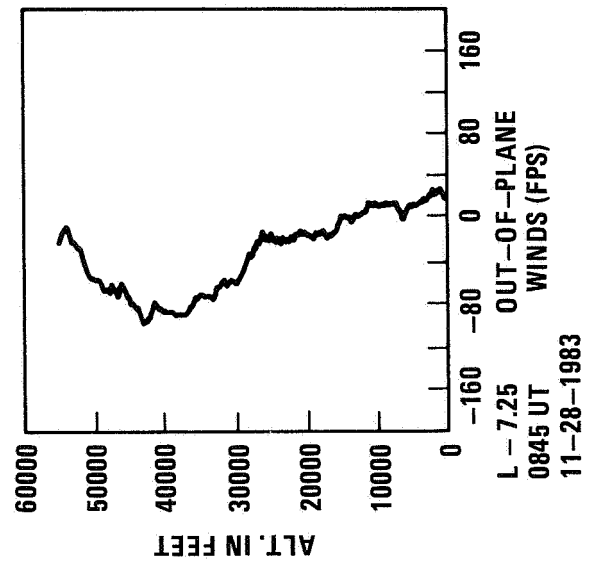


Figure 8. STS-9 prelaunch/launch Jimsphere-measured in-plane component winds (FPS). Flight azimuth = 35 degrees.







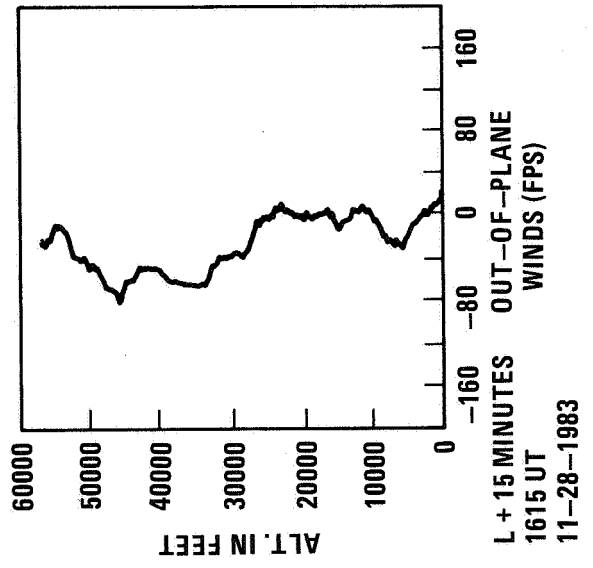


Figure 9. STS-9 prelaunch/launch Jimsphere-measured out-of-plane component winds (FPS). Flight azimuth = 35 degrees.

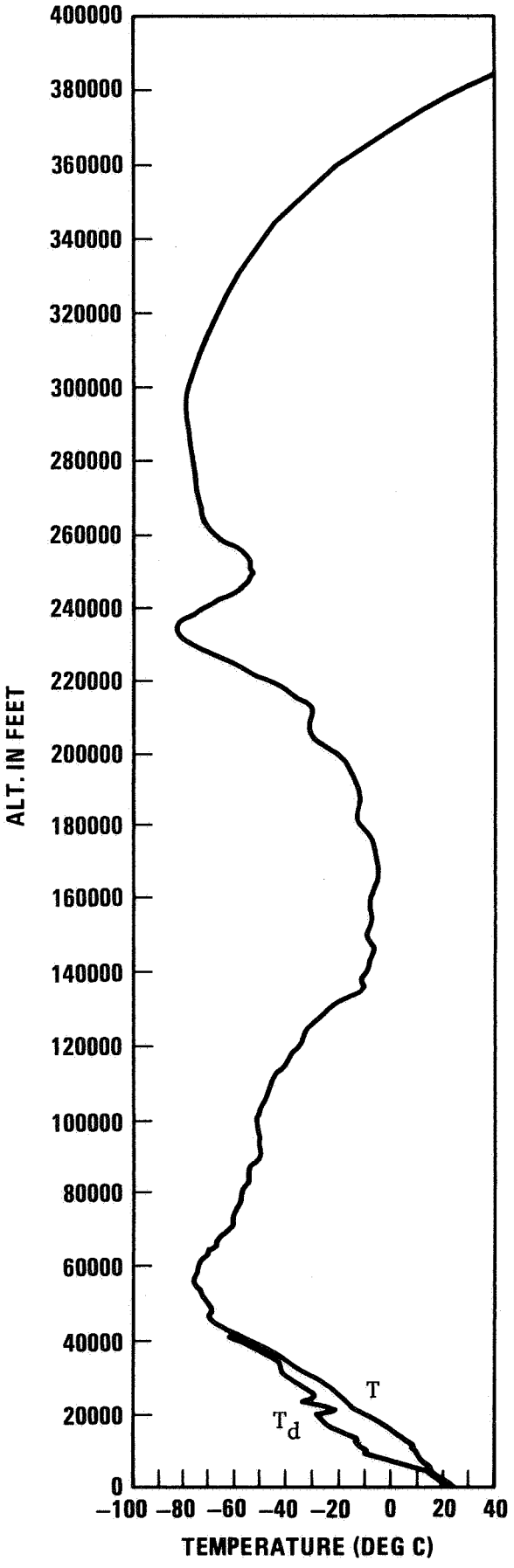


Figure 10. STS-9 temperature profiles versus altitude for launch (ascent).

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APPROVAL

ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-9) LAUNCH

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The information in this report has been reviewed for technical content. Review of any information concerning Department of Defense or nuclear energy activities or programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

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